SOME SPECIES OF *ERIOSPERMUM* IN THE EASTERN CAPE PROVINCE

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ABSTRACT.

Ten species and five varieties of *Eriospermum*, mainly from the divisions of Port Elizabeth, Alexandria, Albany and Bathurst in the Eastern Cape Province, are described and illustrated and notes on their distribution and habitat are given. Four species and five varieties were hitherto unnamed. A classification of the genus into three new sections is proposed and two keys to the species, one for floral characters and one for leaf characters, are given.

INTRODUCTION.

In the course of a survey of the flora of the Alexandria Division, which lies east of Algoa Bay, I found that the genus *Eriospermum* was well represented and that several of the species were obviously unnamed. With growing experience it became evident that in order to recognise even the named species successfully more detailed descriptions and above all illustrations were necessary. It also seemed probable that type specimens of all except two or three of the named species concerned came from nearby districts in the Eastern Cape Province. Having research facilities at the Schönland Botanical Laboratory, Rhodes University, Grahamstown, I was obviously in a good position to extend the enquiry, obtain specimens from type localities and so clear up some of the existing confusion in nomenclature.

This confusion is due to several factors. Flowers of *Eriospermum* appear for only two or three weeks during the late summer and their occurrence is sporadic and dependent on rains. They are for the most part inconspicuous and easily overlooked. Then again several species may occur in the same locality and only careful examination will show up the differences between them, so that flowers of one species have been associated with the leaves of another, even flowers of *Ornithogalum* and *Urginea* appearing on the same herbarium sheet as leaves of *Eriospermum*. Furthermore, all the recognised species in the Eastern Cape are hysteranthous. Only one leaf is produced from each growing point during the year and this appears when the inflorescence is dry and difficult to recognise or after it has disappeared entirely. Occasionally one is fortunate enough to find, during the flowering season, a juvenile or adult plant not suited to bearing flowers, in leaf in the late summer when its companions are flowering. Normally plants flower for a short period between January and April and leaves appear in May and last till October or November. For this reason I have compiled two keys to the species, one using floral characters and one leaf characters.

My endeavour to cultivate plants so as to associate the correct leaf with its particular inflorescence made me aware that the tuber is a very useful feature in determining the species. Tubers are noticeably absent in herbarium material and little or nothing is said of them in published descriptions. Probably this is due to the rather arduous work of following up the shoot in hard sandy-clay soils and also to the difficulty of preparing them for preservation. Yet they supply evidence at any season of the year and give a valuable clue as to what may be expected of the missing part, be it inflorescence or leaf. In all the plants that I have examined the colour of the flesh of the tuber is a constant specific character. Further species whose tubers have white flesh bear flowers with more or less equal segments and simple leaves. These I have grouped together in a section *ALBUM*. Tubers with pink flesh have dimorphic flowers, the inner and outer segments being quite different in shape. Such species have either simple leaves, in which case I have classified them in a section *RUBRUM*, or they may have peculiar processes or enations growing up from the surface of the leaf, in which case I have placed them in a section *ENATUM*. I have collected only one species in the Eastern Cape belonging to the latter section viz. *E. Dregei*, Schönland. It is only mentioned briefly here since it has been well described and illustrated[15]. The section *ENATUM* is well represented in the Western Cape[3] and possibly other species are also present in the Eastern Cape and Cape Midlands.

In basing the sections primarily on tuber and floral characters I have not overlooked the work of Salisbury [12], Baker[1], Duthie[3] and Salter[13] who place most emphasis on leaf characters. But the very nature of a leaf makes it of all plant organs the most subject to environmental conditions. As with other plants, so too with *Eriospermum*, the shape of the leaf may be very variable e.g. *E. dissitiflorum* where the leaf may be short and ovate or very elongated and oblong. Hence although my experience of *Eriospermum* as a whole is comparatively small, yet it leads me to believe that the sections proposed here will be suitable for the classification of the other species in the genus.

TERMINOLOGY.

The Leaf.—The leaf is radical and in all the species I have examined from the Cape Province it is usual for only one leaf per season to be produced by the growing point. Abnormalities with two leaves occur but are rare, whereas in some of the sub-tropical species two or more leaves are normal. Species with compound tubers do occur in the Cape and some plants have as many as six leaves but here again each "eye" produced only one leaf per season.

The genus is noteworthy amongst the monocotyledons for having a leaf which superficially resembles a dicotyledon leaf with stalk-like petiole and expanded lamina. It is not my intention here to deal with its morphology as I am satisfied from my own observations and from discussions with Mr. Garside, who has studied seedling development in the genus[3], that the *stalk-like petiole* of the leaf approximates most closely to the sheath of a grass leaf and it is referred to therefore as the *leaf-sheath.* The expanded portion above the sheath is described as the *lamina.* As I am only dealing with species with simple leaves I refrain here from commenting on those species which produce enations from the leaf. Other terminology relating to the lamina has been kept as simple as possible, the term *cordate* being used to refer only to the base of the leaf, i.e. when it is lobed as in the conventional drawing of a heart.

The degree of hairiness of a leaf is a very variable character. From my examination of herbarium material I would suggest that the early species *E. lanuginosum* Jacq. be given preference over *E. pubescens* Jacq. but, not having the opportunity of examining fresh material from different localities I do not presume to carry this any further.

The spots which appear on the lamina when it is dried may be a useful character in diagnosing the species. They are formed by individual mucilage cells or groups of them[3]. In *E. cordiforme* for example they occur in easily visible groups on the upper surface and are arranged in short lines parallel to the long axis on the lower surface (Fig. 12. 4 *b* and *c*).

Inflorescence.—This consists of a single stalk or *peduncle* terminated by a *raceme* of flowers. The peduncle is radical and is at first enclosed by a *spathe.* I have found the spathe a useful character for distinguishing between species. In only one species known to me does it remain subterranean, this species I have named *E. occultum* (Fig. 4) because the spathe is hidden. In all other species mentioned in this work the spathe grows up forming a *sheath* round the base of the peduncle and terminates in a bract, the *peduncular bract.* The bract may be exserted and ascending as in *E. lancaefolium* var. *orthophyllum* (Fig. 10) or only just emerging at ground level as in *E. Dyeri* (Fig. 14) and *E. thyrsoideum* (Fig. 11), where it is retrorse, the apex turning backwards and downwards. Occasionally the bract is large and similar to the leaf. This I have seen only in species with white tubers and rotate flowers as for example the new species *E. bracteatum* (Fig. 5) and in some species from South West Africa and the Orange Free State.

The raceme of *Eriospermum* may be loose with long pedicels as in *E. thyrsoideum* (Fig. 11) or spike-like with short pedicels as in *E. Zeyheri* (Fig. 6). As in many of the Liliaceae so with a number of species of *Eriospermum* the raceme and pedicels may elongate noticeably as the fruit ripens. To avoid confusion I have given measurements of both these organs as they are when the lowermost flowers are open. The length of the raceme in relation to the length of the peduncle, as taken from the peduncular bract to the base of the raceme, is also a useful diagnostic character. For example it will distinguish between the two sections *ENATUM* and *RUBRUM* and between the species *E. Zeyheri* and *E. porphyrium*, distinctions which may be difficult if specimens with leaves are not available.

The Flower.—Flowers in this genus are comparatively small, segments being rarely more than 6 mm. long and the diameter of open flowers being of the order of 10 mm. As previously pointed out, it seems very probable that the form of the flowers is linked with the colour of the tubers. I must emphasize, however, that I have very little knowledge of the species in the section *ENATUM*, my information regarding them being based chiefly on the descriptions given by Duthie[3].

In the section *ALBUM* the segments are more or less equal and the flowers, when fully open, are either cup-shaped as in *E. brevipes* and its varieties (Fig. 2) or rotate as in *E. Zeyheri* (Fig. 6) and all other species assigned to this section. As the interpretation of petal shapes can be very misleading, I give a pictorial table (Fig. 1) to illustrate the terms I have used: in each case L= length, W = width and P = point of intersection of L and W. I prefer to use the term spatulate, meaning shaped like a spatula, as having a truncate base in contrast to obovate, meaning like an inverted egg, in which case the base would be rounded.

In the section *RUBRUM* the flowers are dimorphic, the segments being distinctly unequal in shape. The term "galanthoid" has been used by Duthie[3] to describe this particular type of flower in *Eriospermum*, but I think this is misleading as the pendent flower of the Snowdrop differs in so many respects from the small erect flowers in this section of *Eriospermum*. I prefer to use the more general term "triangular" for the flowers in this section, as when they are open both side and surface views fit very neatly within the outlines of such a figure. The outer segments are generally elliptic, acute and arcuate or recurved. The inner segments are erect, and when detached and spread out flat, very broadly spatulate, the upper part being gently rounded or almost truncate and with a finely fimbriate margin. In its natural position this upper part forms a fold backwards, giving a pinched appearance, the apex being then retrorse and the outline of the segment as a whole appearing to be deltoid, e.g. *E. lancaefolium* var. *orthophyllum* (Fig. 10).

As remarked by Duthie[3] the flowers of *Eriospermum* are sensitive to light and temperature. In the most sensitive species they open for only a few hours in the afternoon. Individual flowers last only two or three days and in hot dry weather may fail to open at all. Some inflorescences are so slender and camouflage so well with their surroundings, as for example *E. thrysoideum*, that in spite of their occurring not infrequently in a locality I know well, I have had to search diligently in order to spot the plants.

Quite a number of species have a strong scent when the flowers are open; it is sweet, heavy and oily and reminds some people of the scent of coltsfoot oil.

Features of the stamens, ovary, fruit and seed are adequately described in the text and present no outstanding characteristics which require further comment.

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KEY TO PLANTS WITH FLOWERS.

1. Tubers with white flesh, flowers more or less regular . . . . Section I. *ALBUM*
   Tubers with pink flesh, flowers dimorphic . . 2

2.	Peduncle long, 10 cm. or more, raceme shorter than peduncle or, very rarely, equal to it	Section II. *RUBRUM*
	Peduncle short, 4 cm. or less, raceme equal to or longer than peduncle	Section III. *ENATUM* e.g. *Eriospermum dregei*

Section I. *ALBUM*.

1.	Flowers cup-shaped, peduncular sheath pubescent	(1) *E. brevipes* et var.
	Flowers rotate, peduncular sheath glabrous	2
2.	Stamens bifid	(2) *E. bifidum*
	Stamens simple	3
3.	Peduncular bract subterranean, white	(3) *E. occultum*
	Peduncular bract not subterranean, not white	4
4.	Raceme deltoid, peduncular bract leaf-like, orbicular, cordate, up to 5 cm. diam., margin undulating	(4) *E. bracteatum*
	Raceme elongated, spike-like, peduncular bract elliptic-ovate, rarely up to 4·5 cm. long or up to 2 cm. broad, margin not undulating	5
5.	Raceme more than half as long as peduncle, peduncular bract liver-coloured on lower side, up to 1·2 cm. long	(5) *E. zeyheri*
	Raceme less than half length of peduncle, peduncular bract glaucous or glossy purple on lower side, up to 4·5 cm. long	(6) *E. porphyrium* et var.

Section II. *RUBRUM*.

1.	Inflorescence loose, lowermost pedicels up to 5 cm. long when in flower*, spreading at an angle of 60° to 90° to axis	2
	Inflorescence tight or spike-like, lowermost pedicels up to 1 cm. long when in flower, at an angle of 45° or less to axis	3
2.	Peduncular bract exserted, lanceolate, erect, light green	(7) *E. lancaefolium* var. *orthophyllum*
	Peduncular bract at soil level, ovate, retrorse, liver-coloured	(8) *E. thyrsoideum*
3.	Inflorescence secund	(9) *E. cordiforme*
	Inflorescence not secund	4
4.	Peduncular bract lanceolate, ascending, light green	(10) *E. dissitiflorum*
	Peduncular bract ovate, retrorse, purplish red, dry leaf of previous year obvious	(11) *E. dyeri*

*N.B.—In most species the pedicels elongate somewhat as the fruit ripens.

KEY TO PLANTS WITH LEAVES.

1.	Tubers with white flesh, leaves simple	Section I. *ALBUM*
	Tubers with pink flesh, leaves simple or with enations	2
2.	Leaves simple	Section II. *RUBRUM*
	Leaves with enations	Section III. *ENATUM* e.g. *Eriospermum dregei*

Section I. *ALBUM.*

1.	Lamina lanceolate with acuminate base	(2) *E. bifidum*
	Lamina ovate or orbicular, base cordate	2
2.	Leaf-sheath pubescent	3
	Leaf-sheath glabrous	5
3.	Lamina up to 2 cm. long, pubescent	(1a) *E. brevipes* var. *nanum*
	Lamina 4 to 9 cm. long, pubescent or glabrous	4
4.	Lamina not glossy, generally but not always pubescent	(1) *E. brevipes**
	Lamina glossy, glabrous	(1b) *E. brevipes* var. *nitidum*
5.	Lamina succulent, bright green, pressed firmly to the ground	(5) *E. zeyheri*
	Lamina not succulent, not pressed firmly to the ground	6
6.	Lamina leathery, glaucous on upper surface	7
	Lamina mesophytic, light green	10
7.	Lower surface of lamina dark purple	8
	Lower surface of lamina glaucous	9
8.	Tuber without stolons	(6) *E. porphyrium*
	Tuber with stolons	(6a) *E. porphyrium* var. *stoloniferum*
9.	Tuber solitary, underground shoot up to 20 cm. long, sinuous, with loose membranous sheaths, lamina with smooth margin	(6b) *E. porphyrium* var. *pallidum*
	Tuber compound, underground shoot up to 7 cm. long, not sinuous, sheaths fibrous, compact, lamina with undulating margin	(4) *E. bracteatum*
10.	Leaf-sheath exserted, up to 30 cm. long	(8) *E. occultum**
	Leaf-sheath not exserted, lamina glossy	(1b) *E. brevipes* var. *nitidum*

*N.B.—Juvenile plants of *E. occultum* sometimes have a pubescent leaf-sheath and therefore, with this key, might be confused with *E. brevipes.* See description of species for full details.

Section II. *RUBRUM.*

1.	Lamina lanceolate or oblong, at least three times as long as broad, base rounded or acuminate	2
	Lamina ovate or orbicular, not more than twice as long as broad, base cordate	3
2.	Lamina leathery, generally with acuminate base and marked with short reddish brown lines when dry	(7) *E. lancaefolium* var. *orthophyllum*
	Lamina mesophytic with rounded base	(10) *E. dissitiflorum*
3.	Lamina thickly pubescent on both sides	(11) *E. dyeri*
	Lamina glabrous marked with reddish brown spots and/or lines when dry	4
4.	Lamina leathery, glaucous when dry marked with numerous minute spots on upper surface	(8) *E. thyrsoideum*
	Lamina succulent, light green, when dry marked with numerous spots on upper surface and short lines on lower surface both of which are easily visible to the naked eye	(9) *E. cordiforme*

1. **Eriospermum brevipes** Baker. Journ. Linn. Soc. XV, 263, 1876; Gard. Chron. XIV, 231, 1880; Flor. Cap. VI, 372, 1896. Fig. 2.

Plants hysteranthous, flowers January—March, leaves April—October.

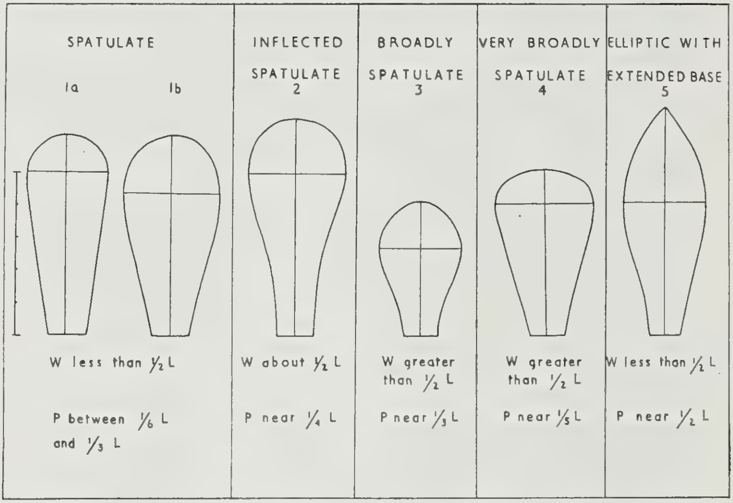

Fig. 1.—Terms used for shapes of perianth segments, e.g. 1a, *Eriospermum zeyheri*; 1b, *E. bracteatum*, outer segment; 2, *E. porphyrium* var. *pallidum*; 3, *E. brevipes*; 4, *E. cordiforme*; 5, *E. bracteatum*, inner segment. L = length, W = width, P = point of intersection of L and W. Scale = 5 cm. *Del.* E. E. A. A.

Tubers solitary, generally pyriform, up to 3 cm. long, up to 2·5 cm. diam., but under long grass or trees irregularly cylindrical and up to 6 cm. long, occurring about 4—12 cm. below ground level, generally horizontal, occasionally vertical, outer skin thin, grey or light brown, inner flesh soft, white with very slight purple tinge near growing point; shoot generally lateral from the broad end, occasionally apical, lateral groove very shallow or absent, base of shoot surrounded by 2—4 soft, membranous, rust-coloured remains of old leaf bases, which are $\frac{1}{3}$—$\frac{1}{2}$ as long as subterranean part of shoot. *Leaf* solitary; leaf-sheath 5—22 cm. long, up to 4 mm. diam., not exserted in short grass, exserted and lax in long grass or under trees, lower part white, glabrous, upper part green, sometimes with purple tinge, deeply grooved, pubescent or occasionally almost glabrous; lamina prostrate or laxly ascending, orbicular

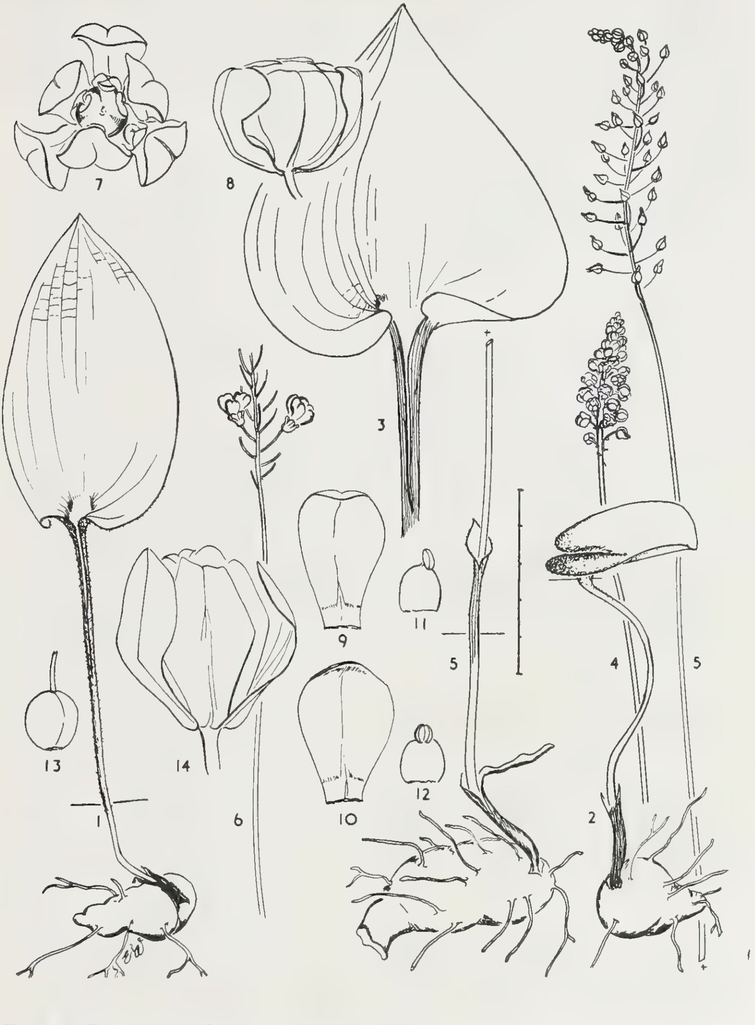

Fig. 2.—*Eriospermum brevipes*, Baker. 1, Plant from under pine trees; 2, plant from short grass near bush clump; 3, lamina and part of leaf-sheath from long grass; 4, young inflorescence, lowermost flowers open; 5, plant towards end of flowering; 6, inflorescence with fruit; 7, flower viewed from above; 8, flower, side view; 9, outer segment; 10, inner segment; 11, outer stamen; 12, inner stamen; 13, gynoecium; 14, large flower from sheltered locality. 1—6, scale = 5 cm.; 7—14, scale = 5 m. *Del.* E. E. A. A.

or ovate, cordate, 4—9 cm. long, width not less than half length, acute or obtuse, with or without apiculus, light green on both sides, thin with longitudinal and transverse veins becoming prominent on drying, upper surface glabrous or very finely and sparsely pubescent, lower surface pubescent, rarely glabrous, margin entire. *Peduncle* flexuous, 30—40 cm. long, up to 2·5 mm. diam., bright shiny green in long grass, pale glaucous green in short grass, glabrous, longitudinally ribbed when dry; basal sheath exserted up to 3 cm., white below, light green above, occasionally tinged with purple, slightly ribbed, pubescent; bract ovate, about 1·5 cm. long, ascending, light green, lower surface and margin pubescent, upper surface glabrous. *Raceme* spicate, with 10—50 flowers, dense, 1—4 cm. long when lowermost flowers are open, elongating and becoming looser as flowers towards apex open; bracts 1 mm. or less, ovate, white, membranous; pedicels ascending, lowermost 2—3 mm. long when flowering, spreading and elongating up to 12 mm. as fruit ripens, glabrous. *Perianth* cup-shaped, incurved, up to 4·5 mm. long, 5 mm. diam., with a scent like that of colts foot oil; segments almost free, more or less equal, up to 4·5 mm. long, ascending, arcuate, incurved, broadly spatulate, translucent white with green median veins, outer up to 2 mm. broad, inner up to 2·9 mm. broad. *Stamens*. Filaments attached to base of segments, broadly ovate, abruptly apiculate, 1—1·7 mm. long, 0·8—1·3 mm. broad, the inner slightly shorter and broader than the outer; anthers about 0·5 mm. long, introrse, slightly spreading at base. *Ovary* spherical or slightly ovoid, up to 1·5 mm. long, green; style filiform, equal in length to ovary, white, stigma truncate, slightly papillose. *Capsule* turbinate, up to 6 mm. long, apex depressed, carpels irregularly bilobed above, grey-green with occasionally a purple tinge, surrounded at base by old perianth parts. *Seeds* about 2 mm. long, thickly covered with white hairs about 3 mm. long which turn brown when dried.

EASTERN CAPE PROVINCE. Knysna Division, Formosa, Plettenberg Bay, *Fourcade* 2000. Humansdorp Division, Road between Galgebosch and Melk River, *Burchell* 4779. Port Elizabeth Division, Algoa Bay, *Cooper* (type at Kew); Baakens River Valley nr. Hallack Road (coll. C. Moodie), *Archibald* 7384a. Alexandria Division, Zandvlakte (Sandflats) near the Bushman's River, *Baur* 1029; Quaggas Vlakte 5 miles west of Sandflats, *Archibald* 7244; 6 miles from Nanaga on Addo Road, *Archibald* 7243, 7435; Kamtra Flats, *Archibald* 4122; Hill overlooking De Kol, *Archibald* 7338; Waaiheuwel, *Archibald*, March 1958; grassveld north of Alexandria Forest, *Archibald* 7201, 7440. Bathurst Division, Port Alfred, near the golf course, *Archibald* 7367, 7426, (coll. M. Hoernle), *Archibald* 7450.

The earliest records of *Eriospermum brevipes* are the specimens collected by Burchell on 17th February, 1814, in the Humansdorp Division. The specific epithet "brevipes" given by Baker refers to the small tuber which looks like a little foot. The cup-shaped appearance of the flower is, in the Eastern Cape, peculiar to this species, all other named members of the genus having either rotate or triangular flowers. Having examined numerous fresh flowers from different localities and compared them with drawings of a dissection of Burchell's specimen, kindly made for me by Dr. Sheila Hooper at the Royal Herbarium, Kew, I disagree with Baker who described the segments as oblong and the filaments as lanceolate. The segments show many small variations but I think it is preferable to describe them as broadly spatulate (Fig. 1. 3). The filaments also show small variations but are never lanceolate but ovoid with a short apiculus.

E. brevipes is one of the commonest species of the genus in the sandy soils of the coastal grassveld. The degree of exposure, as governed by aspect and the surrounding vegetation, is apparently responsible for the variation in the size and hairiness of the leaf. In short grass at Port Alfred the lamina is prostrate and orbicular, but in long grass on the border of the Alexandria Forest the leaf-sheath may be exserted for as much as 15 cm., and the lamina is ascending and ovate. This is more like the type from the Baakens River Valley, Port Elizabeth. In both localities the lamina is sparsely pubescent whereas at Sandflats, where limestone is prevalent on northern aspects and the grass is short and sparse, the lamina is densely pubescent. Apart from these variations I think it advisable to distinguish the two varieties given below.

Var. *nitidum* Archibald var. nov. Tuberibus elongatis informibus foliis nitidis glabris distinguitur.

Tuber horizontal, irregular, elongated, up to 6 cm. long, 1·5 cm. diam., occasionally two shoots from the same tuber. *Leaf* prostrate, leaf-sheath not exserted, glabrous or sparsely pubescent; lamina ovate, cordate, acute, glabrous, glossy, light green. *Inflorescence* as in type with up to 25 flowers, pedicels up to 7 mm. long. *Perianth* as in type. *Capsule* about 5 mm. long.

Albany Division, Mountain Drive near Pumping Station, Grahamstown, *Archibald* 7411; east bank of road above Grey Reservoir, Mountain Drive, Grahamstown, *Archibald* 7414, 7449.

This form occurs in sandy Witteberg quartzite soil, under pines where formerly a dense community of grass and small shrubs flourished.

Var. *nanum* Archibald var. nov. Plantis parvioribus distinguitur.

Tuber ovoid or irregular, 1—2 cm. long, up to 1 cm. diam. *Leaf* prostrate or ascending, leaf-sheath scarcely exserted, pubescent only below lamina; lamina orbicular, cordate, obtuse, mucronate, up to 2 cm. long, nearly as broad as long, thin, pale green, pubescent. *Peduncle* up to 30 cm. long, very slender, flexuous. *Raceme* about 1/6 as long as peduncle with 5—16 flowers. *Perianth* parts smaller than in type. *Capsule* about 4 mm. long.

Alexandria Division, Kamtra River Valley, southern aspect under bush, *Archibald* 7188. Bathurst Division, Kasouga, in sandy soil 50 yds. from river, *Dyer* 877. Albany Division, Carls Rust Farm, Highlands, *Dyer* 610; towards Grahamstown from Stone's Hill Beacon, *Dyer* 382.

Dyer's specimens were named *E. velutinum* (Dyer 877, 382) and *E. albiflos* (Dyer 610) by Marloth. However, these names appeared only on the herbarium sheets and were never published. I can find no reason for making specific distinction between these specimens and prefer to regard them as a small form of *E. brevipes* Baker. The plants are persistent in sheltered sandy situations in the coastal belt and no large leafed forms have been observed in the vicinity, which indicates that they are a true dwarf form and not merely juvenile plants.

2. **Eriospermum bifidum** R. A. Dyer, Bothalia VI. 2, p. 443, 1954. Fig. 3.

Plants hysteranthous, flowers January—March, leaves May—November or persisting until January if no flowers are produced. *Tubers* generally solitary but occasionally compound with 2—4 shoots, young tubers pyriform, older ones irregularly cylindrical, up to 9 cm. long, with individual parts up to 5 cm. diam., 10 cm. or more deep in soil, vertical, growing point at base, shoot in lateral groove, skin tough, light brown, inner flesh leathery, white, base of shoot surrounded by a thick mass of fibres of old leaf bases reaching up to ground level. *Leaves* one per season from each growing point, so that compound tubers have several leaves; leaf-sheath 9—14 cm. long, about 1 mm. diam., upper third exserted, erect, wiry, green or dark reddish brown, faintly ribbed, glabrous; lamina lanceolate with acuminate base, up to 12 cm. long, 2—3 cm. broad, opened out in shade, folded up about long axis in sun, leathery, glaucous, glabrous, entire, occasionally with red margin, slightly mucronate, longitudinal veins usually conspicuous. *Peduncle* 5—28 cm. long, 1—1·5 mm. diam., erect, flexuous in shade, light green, or olive green with waxy bloom in sun, shading to red at base, glabrous; basal sheath green ribbed with red, glabrous; bract appearing at ground level, ovate, cordate, obtuse, up to 15 mm. long, 12 mm. broad, glabrous, green. *Raceme* 1·5—13 cm. long, with 8—58 flowers, loose; bracts minute, white, membranous; pedicels flexuous, spreading, lowest 1—3 cm. long, uppermost

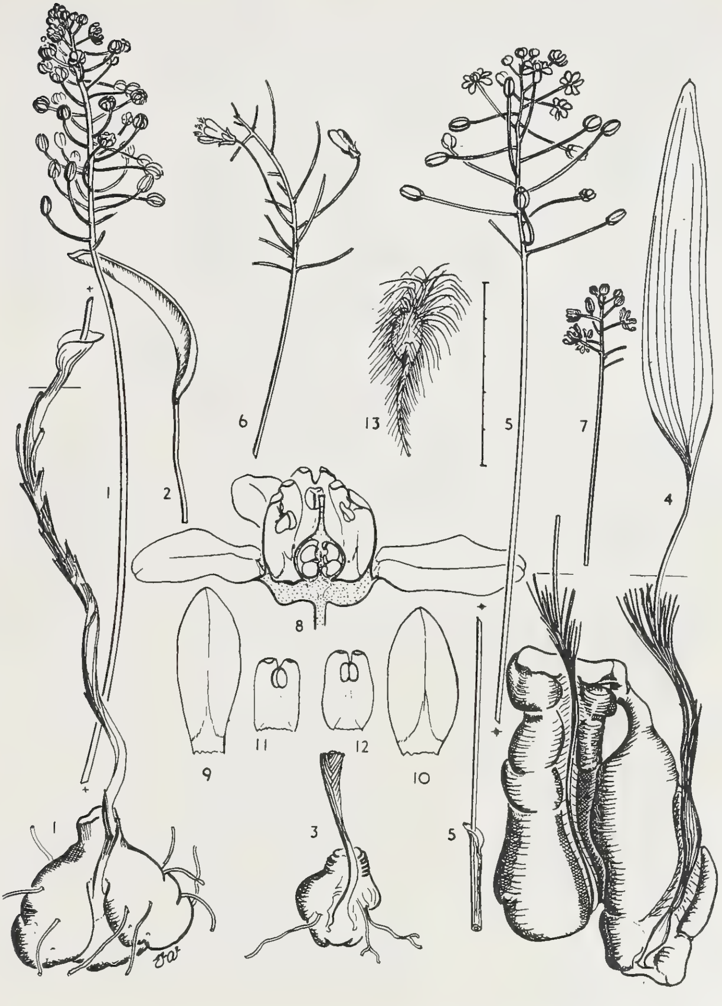

FIG. 3.—*Eriospermum bifidum*, Dyer. 1, Plant in flower; 2 and 3, leaf and young tuber from same locality as 1; 4, compound tuber, in leaf, from shaded locality; 5 and 6, inflorescence in flower and fruit from same locality as 4; 7, small inflorescence from very exposed locality; 8, longitudinal section of flower; 9, outer segment; 10, inner segment; 11, outer stamen; 12, inner stamen; 13, seed. 1—7, scale = 5 cm.; 8—12, scale = 5 mm.; 13, scale = 1 mm. *Del.* E. E. A. A.

about one-third as long, 0·5 mm. diam., glabrous, similar in colour to peduncle. *Perianth* rotate, 11 mm. diam., open during the day, closed at night: segments shortly united at base, nearly similar, 4—5 mm. long, outer elliptic, 1·8 mm. broad, inner elliptic with extended base, 2 mm. broad, greenish yellow, with darker green median vein. *Stamens.* Filaments joined to segments at base, free part oblong, about 2 mm. long, 1·2 mm. broad, the inner slightly larger, greenish yellow in bud, in open flowers bright orange, erect, connivent, bifid above with thickened, incurved tips; anthers introrse, about 1 mm. long joined to filament by short connective at base of bifurcation. *Ovary* nearly spherical, about 1·5 mm. diam., green; style white, equal in length to ovary; stigma somewhat capitate, trifid, papillate. *Pollination.* The filaments form a cylinder round the gynoecium and the pollen is shed directly on to the stigma. *Capsule* about 1 cm. long, narrow at base, expanded above and irregularly lobed. *Seeds* less than 1 mm. long, comma-shaped, covered with soft white silky hairs which turn light brown with age.

EASTERN CAPE PROVINCE. Albany Division, 8—10 miles from Grahamstown at Botha's Hill, *Dyer* 670, 1299 (type in Albany Museum Herbarium); 35 miles from Grahamstown on old Port Elizabeth Road, *Dyer* 1084; 22—24 miles from Grahamstown towards Carlisle Bridge, *Dyer* 2113; Committees, *Dyer* 513; 12—13 miles from Grahamstown near Hounslow, *Archibald* 7460, 7470. Bathurst Division, near Clumber, *Dyer* 383a. Alexandria Division, Bushman's River Poort, *Archibald* 5754, 6080, 7410, 7434b; Payne's Farm, *Archibald* 7481; De Hoop road 5 miles from Waaiheuwel turnoff, *Archibald* 7443.

Eriospermum bifidum is the only known member of the genus that has bifid filaments. Among the lanceolate leaved species it is conspicuous in having rotate flowers with equal segments, all other Eastern Cape species with this distinction having dimorphic segments. Other characters which make it easy to distinguish when flowers are not present are the leathery leaf and the tough white flesh of the tubers which generally have a thick brush of coarse fibres round the basal part of the shoot.

It is essentially a plant of arid localities and occurs on shaly soils supporting sclerophyllous and thorny shrubs and low trees (*Rhus spp.*, *Randia rudis*, *Grewia occidentalis*, *Azima tetracantha*, *Schotia speciosa*). A great variety of succulents is present in such communities, the majority belong to the Ficoideae and Crassulaceae, and there are also many geophytes, the Liliaceae being particularly well represented.

3. **Eriospermum occultum** Archibald, sp. nov. Fig. 4. Tuberibus carnosis albis, foliis patentibus, laxis, tenuibus, glabris, orbiculatis, cordatis, racemis spicatis, bracteis pedunculorum occultis distinguitur.

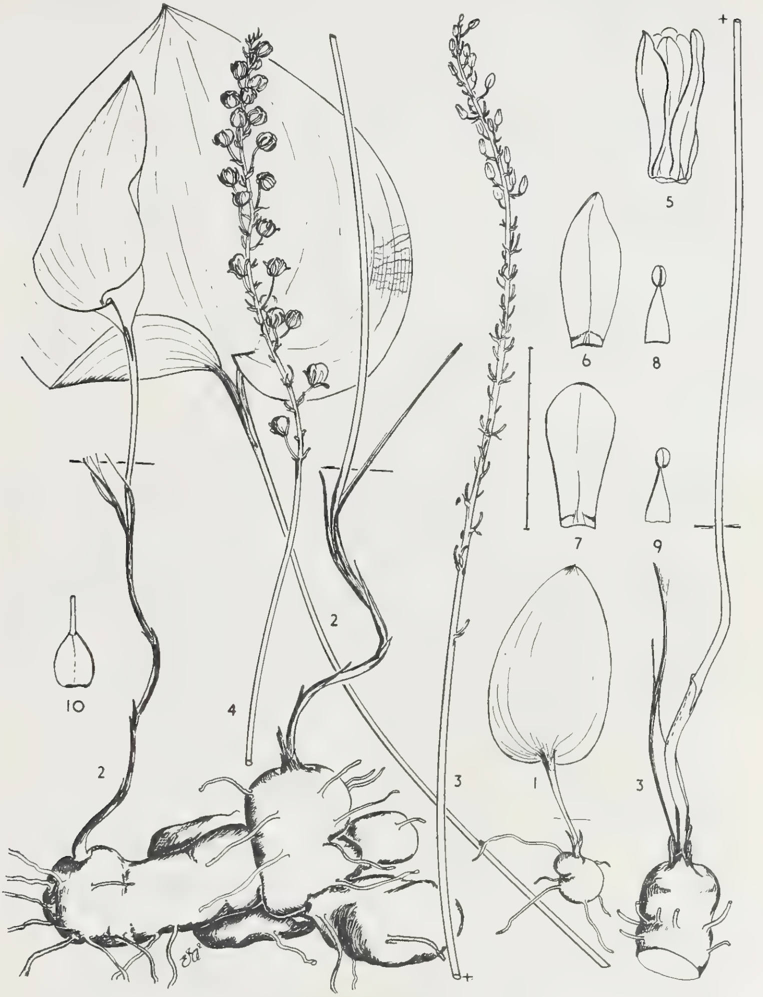

FIG. 4.—*Eriospermum occultum,* Archibald. 1, Juvenile plant in leaf; 2, plant, with compound tuber, in leaf; 3, plant, in late flower, showing subterranean peduncular bract; 4, portion of fruiting inflorescence; 5, side view of old flower; 6, outer segment; 7, inner segment; 8, outer stamen; 9, inner stamen; 10, gynoecium. 1—4, scale = 5 cm.; 5—10, scale = 5 mm. *Del.* E. E. A. A.

Planta hysterantha. *Tubera* parvula globosa, vetusta informia cylindrica, multiplicia, ramosa, usque ad 10 cm. longa, 3 cm. diam., intus carnosa alba. *Folium.* Vagina ad 30 cm. longa, 2—3 mm. diam., exserta, glabra: lamina plana, laxa, tenuis, orbiculata vel obovata, cordata. ad 12 cm. longa et lata, obtusa, apiculata, utrinque viridis et glabra. *Pedunculus* erectus, laxus, ad 60 cm. longus, 3·5 mm. diam.; bractea occulta, subterranea, alba, ligulata, 1 cm. longa. *Racemus* ad 20 cm. longus, spicatus, circa 60 floribus: pedicelli 5 mm. longi: bracteae 2·5 mm. longae. *Perianthemum* rotatum, circa 9 mm. diam., segmenta libera, albida, exteriora 4·5 mm. longa, 1·7 mm. lata, elliptica, interiora 4·2 mm. longa, 2 mm. lata, spatulata. *Filamenta* lanceolata, 2 mm. longa, albida. *Ovarium* 1·5 mm. longum, 1 mm. diam., viride: stylus cylindricus, 1 mm. longus, albidus.

EASTERN CAPE PROVINCE. Alexandria Division, Zuurberg near Somerset East boundary. *Archibald* 7240, 7420 (type in Albany Museum Herbarium).

Plants hysteranthous, flowers sporadic from January—February, leaves appearing after flowers, occasionally a few plants with leaves in January and February. *Tubers* solitary, gregarious or compound, young tubers globose, later elongating and becoming irregularly cylindrical, up to 10 cm. long, 3 cm. diam., compound tubers irregularly branched, occurring to a depth of 14 cm. below ground level, generally horizontal with up-turned growing point. outer skin light grey, slightly corky in older parts, inner flesh white; shoot surrounded by a few short persistent leaf bases which are soft, membranous and golden-brown. *Leaf* solitary from each growing point, generally not more than five from compound tubers; leaf-sheath up to 30 cm. long, 2—3 mm. diam., the upper half or two-thirds exserted, glabrous or rarely in juvenile forms very sparsely pubescent 1—2 cm. below lamina, lax, pale green: lamina laxly spreading, orbicular or broadly obovate, cordate, up to 12 cm. long, width not less than two-thirds length, obtuse, apiculate, glabrous, light green on both sides, thin, when dried with conspicuous longitudinal and transverse veins, margin entire. *Peduncle* erect, fleshy, up to 60 cm. long, 3·5 mm. diam., glabrous, light green, base golden brown: basal sheath white with a few brown spots, subterranean, $\frac{1}{4}$—$\frac{1}{2}$ as long as underground part of peduncle: bract 1 cm. long or less, ligulate, clasping peduncle, hidden by old leaf-sheaths. *Raceme* up to 20 cm. long, spicate, with up to 60 flowers which are irregularly spaced occurring singly or in clusters of 3—4: bracts about half as long as pedicels, lanceolate, membranous, light brown or whitish, pedicels up to 5 mm. long, elongating to 8 mm. as fruit ripens, ascending, arcuate, similar in colour to peduncle, glabrous. *Perianth* ? rotate, buds oblong, segments more or less equal, free; outer segments 4·5 mm. long, 1·7 mm. broad, elliptic, slightly incurved at tip, white with green base and brownish green median vein; inner segments about 4·2 mm. long, 2 mm. broad, spatulate, incurved at tip, similar in colour to outer. *Stamens.* Filaments joined to extreme base of segments, about half length of segments, lanceolate; anthers introrse, versatile, about 0·5 mm. long. *Ovary* ovoid, 1·5 mm. long, 1 mm. diam., green; style cylindrical, 1 mm. long, white; stigma rounded, minutely papillate. *Capsule* about 5 mm. long, nearly spherical, apex depressed, carpels slightly bilobed or entire, surrounded at base by persistent perianth. *Seeds* covered with white silky hairs.

This species is abundant in a small area on a southern slope of the Zuurberg range. It occurs in moist black sandy soil formed from Witteberg quartzite. The slope is densely covered with tussock grasses such as *Miscanthidium*, *Anthoxanthum* and *Festuca* and a variety of scandent herbs, and the *Eriospermum* leaves grow through this vegetation and are supported by it. In the same area under ledges of rock, *E. dyeri* also occurs.

E. occultum may be distinguished from *E. brevipes*, which appears to be its nearest relative, by its subterranean peduncular bract, long spicate inflorescence, conspicuous pedicel bracts and lanceolate filaments. Although I have not seen the flowers open I suspect that they are rotate and not campanulate as in *E. brevipes*. The large leaf with its long exserted leaf-sheath indicates a very vigorous form of growth, but on only one occasion have inflorescences (in a very advanced stage) been obtained in spite of frequent visits to the locality at times which were judged propitious. Either the flowers of this species are very sporadic or it flowers at an unusual season. In cultivation over a period of more than two years leaves have been produced each season but no flowers.

4. **Eriospermum bracteatum,** Archibald sp. nov. Fig. 5. Tuberibus multiplicibus carnosis albis, foliis planis glabris orbiculatis-cordatis coriaceis, racemis deltoideis, bracteis pedunculorum foliis similibus distinguitur.

Planta hysterantha. *Tubera* parvula ovoidea foliis solitariis, vetusta informia, multiplicia, ramosa, circa quattuor foliis, usque ad 9 cm. longa, 4 cm. crassa, intus carnosa alba. *Folium.* Vagina ad 6 cm. longa, glabra; lamina plana, orbiculato-cordata, 4—8 cm. diam., glauco-viridis, glabra, coriacea, supra paullum pruinosa, infra pallidior haud pruinosa, marginibus rubris undulatis. *Pedunculus* erectus, rigidus, 12—28 cm. longus, 3—4 mm. diam., succulentus, glaber, glauco-viridis, pruinosus; vagina glabra, saepe ad 1 cm. exserta; bractea magna usque ad 5 cm. longa, ovato- vel lanceolato-cordata, infundibuliforma, infra purpurea, alioqui

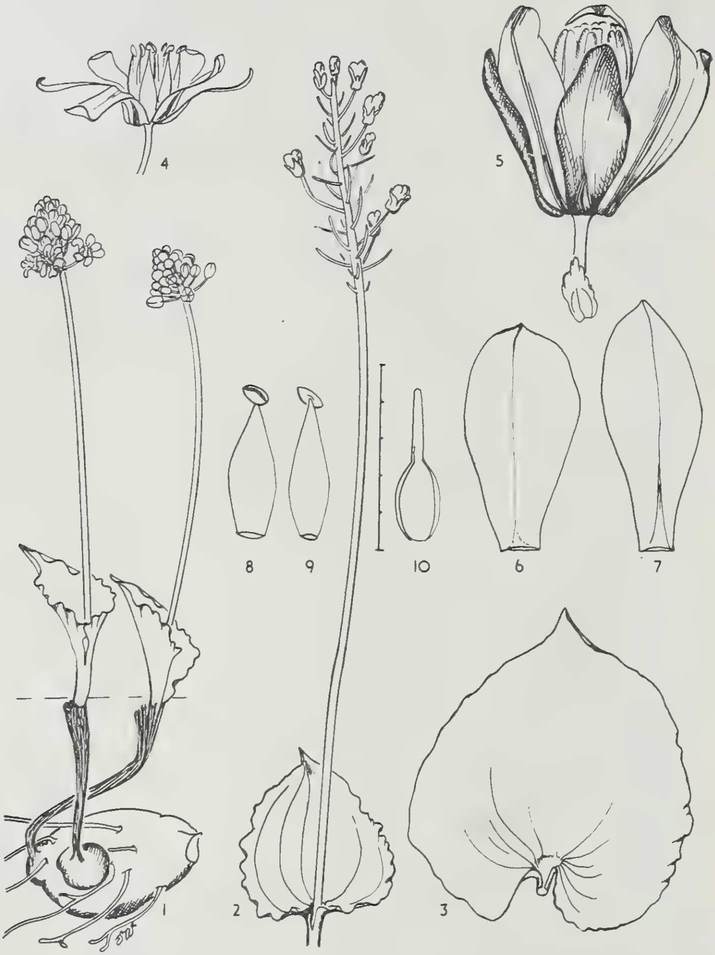

FIG. 5.—*Eriospermum bracteatum*, Archibald. 1, Plant, with compound tuber, in flower; 2, inflorescence, in fruit, with peduncular bract; 3, leaf; 4, open flower; 5, partly open flower with bract; 6, outer segment; 7, inner segment; 8, outer stamen; 9, inner stamen; 10, gynoecium. 1—3, scale = 5 cm.; 4, scale = 1 cm.; 5—10, scale = 5 mm. *Del.* E. E. A. A.

folio similis. *Racemus* circa 3 cm. longus, deltoideus, 20—30 floribus, densus, pedicellis patentibus inferioribus circa 7 mm. longis. *Perianthemum* rotatum, circa 12 mm. diam., segmenta patentia, apice incurvato, obtuso, exteriora 5—6 mm. longa, 3 mm. lata, spatulata, interiora 6—7 mm. longa, 3 mm. lata, elliptica. *Filamenta* lanceolato-subulata, circa 4 mm. longa, interiora breviora et angustiora. *Ovarium* 2 mm. longum, 1 mm. diam.; stylus cylindricus, 2 mm. longus.

EASTERN CAPE PROVINCE. Albany Division, Botha's Ridge, about 11 miles north-east of Grahamstown, *Archibald* 7198b (type in Albany Museum Herbarium), *Archibald* 7254b, 7364, 7393, 7400 (cotypes); in the angle between Queen's Road and the road to Pluto's Vale, *R. Story* 4033; 6 miles along Cradock Road, *Dyer* 556, 491.

Plants hysteranthous, flowers January—April, depending on rains, leaves appearing after flowers and persisting until November, leaves of non-flowering plants appearing earlier. *Tubers* solitary or compound, young ones ovoid, horizontal, old ones increasing by direct budding becoming irregularly lobed with kidney-shaped lateral portions, up to 9 cm. long, 4 cm. thick, occurring about 6 cm. below soil level, outer skin light brown, inner flesh white, tough; shoots seldom more than four in compound tubers, lateral or basal, passing upwards in a shallow groove, at base surrounded by persistent, hard, tough fibres. *Leaf* one from each growing point, leaf-sheath not exserted, up to 6 cm. long, glabrous, dark purple at ground level shading to white below; lamina prostrate, orbiculate, cordate, 4—8 cm. diam., glaucous, glabrous, leathery, upper surface somewhat pruinose, under surface paler, not pruinose, apex acute, margin red, undulating. *Peduncle* erect, rigid, 12—28 cm. long, 3—4 mm. diam., succulent, glabrous, glaucous, pruinose; basal sheath purple at ground level, white below, glabrous, often exserted for about 1 cm.; bract large, up to 5 cm. long, ovate or lanceolate, cordate, funnel-shaped, with maroon shading on under surface, in other respects similar to the leaf. *Raceme* up to 3 cm. long, deltoid, with 20—30 flowers densely crowded together, elongating to about 6 cm. as fruit ripens; bracts about 1·5 mm. long, slightly saccate, membranous with 3 maroon veins, margin undulating; pedicels spreading, lowermost about 7 mm. long, similar in colour to peduncle, ascending, elongating to about 15 mm. as fruit ripens. *Perianth* rotate, up to 12 mm. diam., showy, with a scent like that of coltsfoot oil, fully open only in afternoon; segments free, outer 5—6 mm. long, 3 mm. broad, spatulate, incurved at tip, yellowish cream inside, heavily shaded with maroon outside, darker towards apex, with a dark grey median vein; inner segments 6—7 mm. long, 3 mm. broad, elliptic, with extended base, apex incurved, cream inside, outside cream with dark maroon apex and green median vein shading to grey at base. *Stamens*.

Filaments joined to extreme base of segments, lanceolate, narrowing at base, subulate, up to 4 mm. long, slightly more than 1 mm. broad at base, the inner slightly shorter and narrower, cream; anthers yellow, 1 mm. long, versatile. *Ovary* ellipsoidal, 2 mm. long, 1 mm. diam., green; style equal in length to ovary, white or green; stigma rounded. *Capsule* about 8 mm. long, more or less cylindrical, dark maroon surrounded by persistent perianth parts at base, apex depressed, carpels irregularly bilobed. *Seeds* about 6 mm. long, 2 mm. broad at top, comma-shaped, covered with long white silky hairs.

E. bracteatum is particularly interesting on account of its peduncular bract which is almost as large as the leaf and similar to it in general appearance. I know of no other species with a bract of this size and can only compare it with the very small species from Queenstown and Bloemfontein, which are little known and which I have seen identified as *E. ophioglossum* and *E. corymbosum* respectively. The latter is attributed to Baker and the former is apparently a manuscript name. In both specimens the bract appears to be equal in size to the leaf which is 1—3 cm. long.

E. bracteatum grows in semi-arid scrub in hard sandy soil, formed from dolerite and shale, on ridges north of Grahamstown where it occurs in company with *E. thyrsoideum*. When in leaf it is very easily confused with the latter species as the leaves are of the same size, texture and colour and the acute apex and undulating margins of *E. bracteatum* are not sufficiently conspicuous to impress the casual observer. Here the similarity ends, for anyone looking closer will discover the minute peduncular bract, bright red tubers and loose, long-pedicelled raceme of *E. thyrsoideum*. The inflorescences of *E. thyrsoideum* are so well camouflaged in the surroundings that they have until now rarely been collected in the Eastern Cape although occurring at the same time as and more abundantly than those of *E. bracteatum*. The flowering of both species is greatly affected by erratic rains but in a good season *E. bracteatum* makes a very attractive show with its purple and cream perianth.

5. **Eriospermum zeyheri** Dyer. Bothalia VI, 2, p. 444, 1954. Fig. 6.

Plants hysteranthous, flowers March—May, leaves June—November or later. *Tuber* solitary, vertical, pyriform, up to 7 cm. long, up to 4 cm. thick at base, occurring from 3—10 cm. below ground level, outer skin tough, corky, inner flesh white; growing point basal, shoot ascending in a lateral groove and surrounded by numerous, persistent, light reddish brown leaf bases which expand trumpet-like just below ground level. *Leaf* solitary; leaf-sheath not exserted, rarely up to 10 cm. long, about 3 mm. diam., glabrous, white; lamina prostrate, held tightly to the

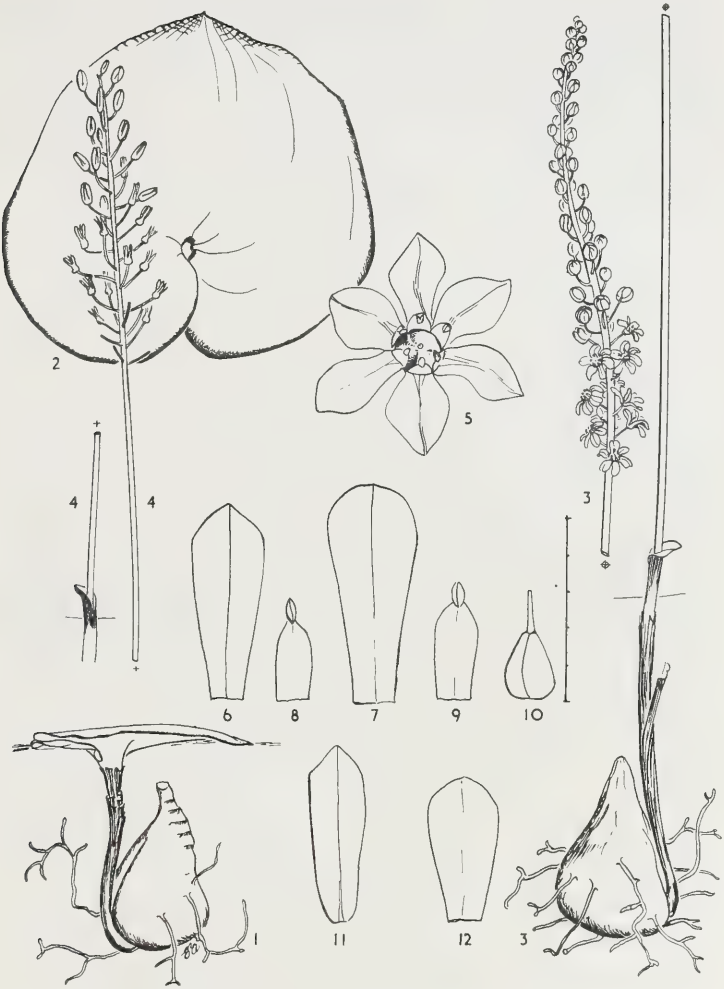

FIG. 6.—*Eriospermum zeyheri*, Dyer. 1, Plant in leaf; 2, leaf, surface view; 3, plant in flower; 4, old inflorescence with elongated pedicels; 5, flower, viewed from above; 6, outer segment; 7, inner segment; 8, outer stamen; 9, inner stamen; 10, gynoecium; 11, outer segment, small flower; 12, inner segment, small flower. 1—4, scale = 5 cm.; 5, scale = 1 cm.; 6—12, scale = 5 mm. *Del.* E. E. A. A.

ground, orbicular, deeply cordate with overlapping lobes, up to 12 cm. diam., glabrous, succulent, glossy, bright green above, paler below, apex obtuse, slightly apiculate, margin curved down and adpressed to ground, entire or slightly undulating in parts. *Peduncle* erect, fleshy, rigid, up to 26 cm. long, about 2 mm. diam., glabrous, slate-grey with liver-coloured markings; basal sheath glabrous, white shading to greenish brown below bract; bract at ground level or slightly exserted, ovate, obtuse, ascending or retrorse, up to 12 mm. long, up to 10 mm. broad, glabrous, dark green above, liver-brown below. *Raceme* more than half length of exserted part of peduncle, with up to 60 flowers, spicate; bracts minutely saccate or vestigial; pedicels similar in colour to peduncle, glabrous, lowermost (when flowers start to open) ascending, about 7 mm. long, uppermost about one-half as long, spreading and elongating to about twice this length as fruit ripens. *Perianth* rotate, opening fully in the afternoon, up to 10 mm. diam., segments nearly free to base, 4—6 mm. long, 1·5—2·5 mm. broad, spatulate, the outer angular above and sometimes slightly smaller than the inner, yellowish cream, the upper part with or without maroon spots, greenish below, median vein green. *Stamens*. Filaments joined to base of segments for less than 1 mm., erect, oblong, apiculate, up to 2·5 mm. long, about 1·5 mm. broad, the outer slightly smaller than the inner, white; anthers oblong, 1 mm. long. *Ovary* pyriform 1·5—2 mm. long, green; style cylindrical, 1 mm. long, white; stigma truncate, minutely papillose. *Capsule* about 4 mm. long, dark green, surrounded at base by persistent perianth parts, apex depressed, carpels irregularly bilobed above, tuberculate. *Seeds* about 2 mm. long, thickly covered with white hairs about 5 mm. long.

EASTERN CAPE PROVINCE. Albany Division, 6 miles along Cradock Road from Grahamstown, *Dyer* 557 (type in Albany Museum Herbarium), *Archibald* 7499. Port Elizabeth Division, on stony hills by Bethelsdorp, *Zeyher* 739; on hills near Port Elizabeth, *Zeyher* 4281. Alexandria Division, 5 miles from Waaiheuwel turnoff on De Hoop road, *Archibald* 7441; Drie Koppen road, right-hand fork after De Hoop: *Archibald* 7496, 7503; left fork of De Hoop road, *Archibald* 7451, 7497, west of Sandflats on Mimosa road, *Archibald* 7492.

The distinguishing characters of this species are its neat, pyriform, vertical tuber with the shoot arising from the base; its succulent leaf which is bright green on both sides and pressed tightly to the ground, and its dense spicate raceme with rotate yellowish green flowers, the ratio of raceme to peduncle being not less than 1 to 2 and on the average about 1 to 1.

The two Zeyher specimens quoted above were identified by Baker as *E. bellendeni*, Sweet (Fl. Cap. vol. vi, p. 374). However, *E. bellendeni*, as figured in Bot. Mag. t. 1382, has dimorphic flowers and a different tuber and leaf. The only species with rotate flowers which might be confused with *E. zeyheri*, Dyer is *E. porphyrium*, Archibald. It, however, differs in all other characters mentioned in the preceding paragraph.

E. zeyheri is a plant of semi-arid localities growing in red sandy clay soils in open veld with shrubs such as *Pentzia*, *Sutera*, *Chrysocoma* and *Ruschia*. In the type locality and all but one of the Alexandria localities it occurs in company with *Eriospermum thyrsoideum*, and *E. porphyrium* and in one of these localities *E. bifidum* and *E. dregei* are also present.

6. **Eriospermum porphyrium** Archibald sp. nov. Fig. 7.

Tuberibus solitariis carnosis albis, foliis planis glabris orbiculato-cordatis infra purpureis, pedunculis crassis, racemis spicatis, perianthemis rotatis distinguitur.

Planta hysterantha. *Tubera* solitaria, pyriformia vel cylindrica, usque ad 8 cm. longa, 4 cm. diam., foris fusca, cornea, intus carnosa candida. *Folium* solitarium; vagina 5—6 cm. longa, circa 6 mm. diam., glabra, haud exserta; lamina horizontalis, tenuis, plana, reniformis vel orbiculato-cordata, usque ad 10 cm. longa, 11 cm. lata, glabra, supra glauco-viridis, infra nitido-purpurea, rotundata vel apiculata, marginibus purpureis. *Pedunculus* erectus, rigidus, usque ad 37 cm. longus, 5 mm. diam., succulentus, glaber, glauco-viridis, pruinosus; vagina usque ad 11 cm. longa, saepe 1—2 cm. exserta, glabra; bractea usque ad 2·5 cm. longa, 2 cm. lata, plus minusve erecta, cordata vel ovata, glabra, supra glauco-viridis, infra purpurea, marginibus purpureis. *Racemus* usque ad 12 cm. longus, spicatus, 25—50 floribus, densus, pedicellis patentibus circa 5 mm. longis. *Perianthemum* rotatum, usque ad 12 mm. diam.; segmenta plus minusve aequalia usque ad 6 mm. longa, circa 2 mm. lata, exteriora spatulata, summa angulata; interiora elliptica, apicibus paulum incurvatis. *Filamenta* erecta, 3—3·5 mm. longa, lanceolata, acuminata, albida. *Ovarium* circa 2 mm. longum, 1·5 mm. diam., viride; stylus cylindricus, 1·5 mm. longus.

EASTERN CAPE PROVINCE. Alexandria Division, rendzina grass veld above Bushman's River Poort, *Archibald* 7199 (type in Albany Museum Herbarium); Kolsrand, *Archibald* 7347a, 3974; Waaiheuwel, *Archibald* 7445, 7491.

Plants hysteranthous, flowers February—May, leaves appearing immediately after flowers, juvenile plants coming into leaf earlier. *Tubers* solitary, horizontal, pyriform or irregularly cylindrical, up to 7 cm. long, 4 mm. diam., occurring about 10 cm. below ground level, outer skin dark brown or black, horny, flesh pure white, tough, roots few; growing point lateral, shoot passing upward in a slight groove; base of

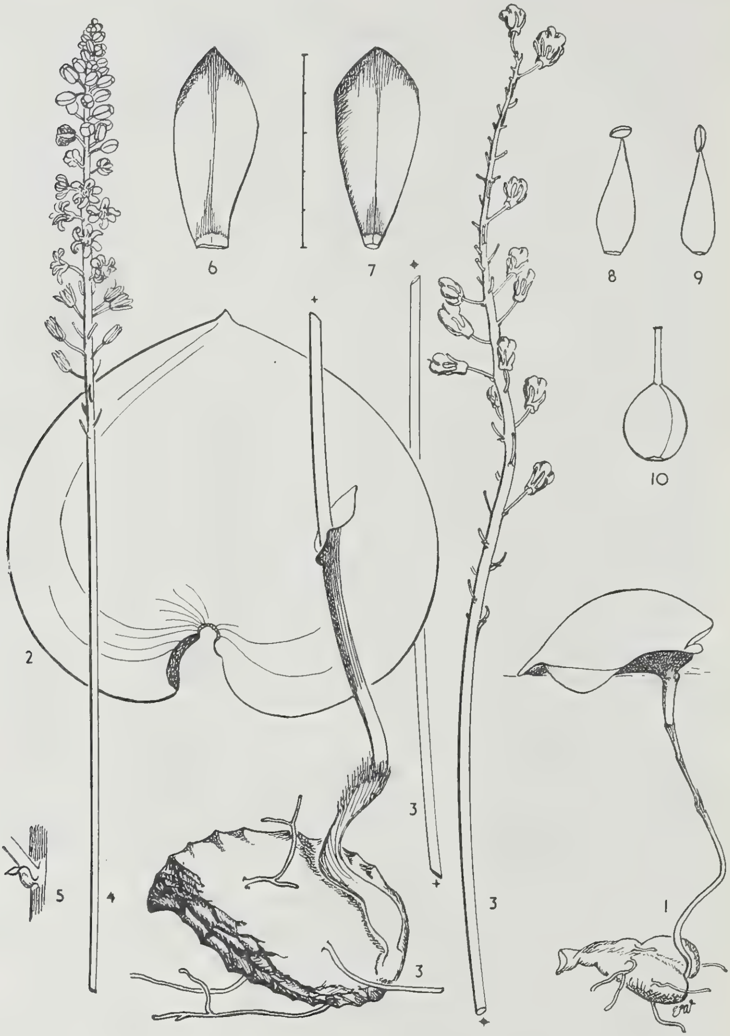

Fig. 7.—*Eriospermum porphyrium*, Archibald. 1, Juvenile plant in leaf; 2, leaf from adult plant; 3, plant in fruit; 4, part of inflorescence in flower; 5, saccate bract at base of pedicel; 6, inner segment; 7, outer segment; 8, inner stamen; 9, outer stamen; 10, gynoecium. 1—4, scale = 5 cm.; 5, scale = 1 cm. (approx.); 6—10, scale = 5 mm. *Del.* E. E. A. A.

shoot surrounded by a few golden brown, somewhat fibrous, persistent leaf bases, 5—6 cm. long. *Leaf* solitary; leaf-sheath 8—11 cm. long, somewhat sinuous, not exserted, white, glabrous; lamina prostrate, thin, reniform or orbicular-cordate, up to 10 cm. long, 11 cm. wide, glabrous, upper surface glaucous olive-green, lower surface glossy dark purple, apex obtuse or shortly apiculate, juvenile leaves slightly more acuminate, margin purple entire. *Peduncle* erect, succulent, up to 37 cm. long, 5 mm. diam. at ground level, glabrous, grey-green, with a waxy bloom; basal sheath up to 11 cm. long, glabrous, white below, shading to dark purple at ground level, generally exserted for about 1—2 cm.; bract ascending, ovate-cordate, up to 2·5 cm. long, 2 cm. wide, glabrous, dark purple below, grey-green above, margin entire purple, apex obtuse or acute. *Raceme* about $\frac{1}{3}$ as long as peduncle, elongating slightly as fruit ripens, spicate, dense, with up to 50 flowers; lowermost bracts nearly 2 mm. long, slightly saccate, membranous, transparent, with maroon base, upper bracts smaller; pedicels about 5 mm. long, elongating to about 10 mm. as fruit ripens, glabrous, similar in colour to peduncle. *Perianth* rotate, about 12 mm. diam. when fully open, with a faint scent of coltsfoot oil, segments more or less free; outer segments up to 6 mm. long, about 2 mm. wide, spatulate, angular above with narrow base, slightly incurved at tip, dark purple with cream tinge towards base, vein slightly darker, inner segments equal in length to outer, elliptic, incurved above, cream with dark purple tip and vein. *Stamens.* Filaments joined to extreme base of segments, 3—3·5 mm. long, erect, white, lanceolate, acuminate, acute, narrowing slightly at base, inner filaments slightly narrower than outer; anthers oblong, about 0·5 mm. long, introrse, versatile. *Ovary* ovoid, about 2 mm. long, 1·5 mm. diam., green; style 1·5 mm. long, filiform, white; stigma truncate, minutely pilose. *Capsule* surrounded by persistent perianth parts, turbinate, about 1 cm. long, 5 mm. broad at top, carpels irregularly bilobed above, apex depressed. *Seeds* about 5 mm. long, 2 mm. broad at top, shaped like a comma, covered with white hairs.

This species has on many occasions been determined erroneously as *E. bellendeni* Sweet. It has, however, no resemblance to the figure in the Botanical Magazine (t. 1832) to which the name *E. bellendeni* was given, as its flowers are regular, not zygomorphic, and the flesh of the tuber is white, not red. *E. porphyrium* is one of the commonest species of the genus in the Eastern Cape where it occurs on several different types of soil. There are at least two clearly distinguished varieties of the species which are dealt with below.

E. porphyrium is most closely related to *E. zeyheri*, Dyer but it is clearly distinguished from the latter by a number of features. For example,

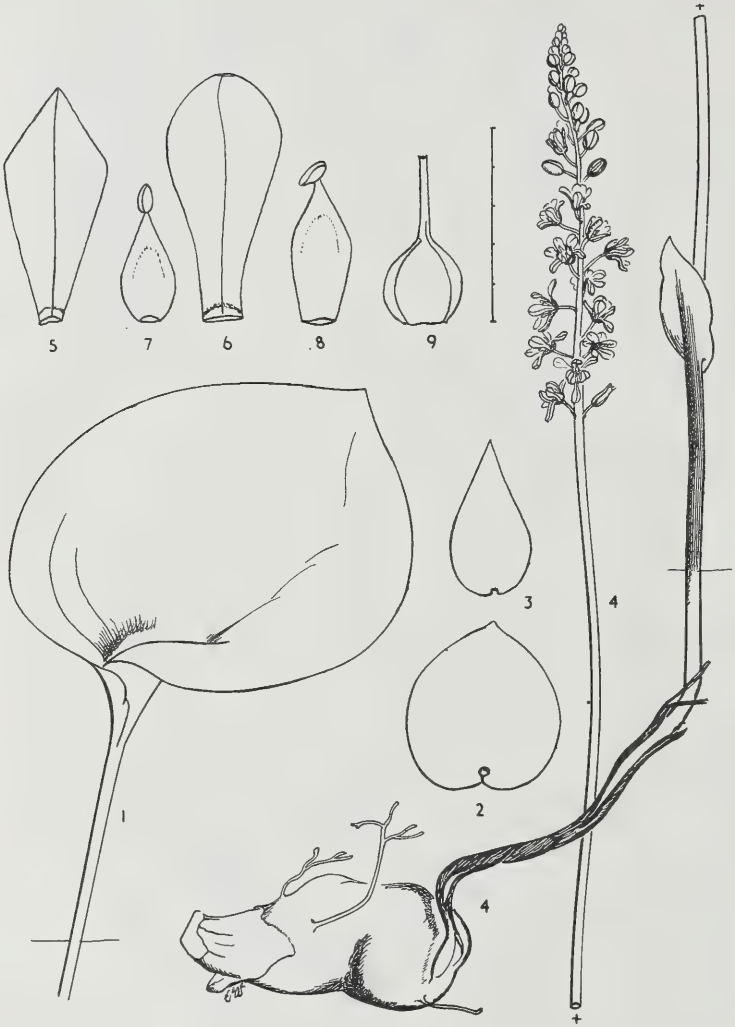

Fig. 8.—*Eriospermum porphyrium* var. *pallidum*, Archibald. 1, Leaf of adult plant; 2 and 3, leaves of juvenile plants; 4, plant in flower; 5, outer segment; 6, inner segment; 7, outer stamen; 8, inner stamen; 9, gynoecium. 1—4, scale = 5 cm.; 5—9, scale = 5 mm. *Del.* E. E. A. A.

its tubers are horizontal not vertical and its peduncular bract is larger, the peduncle itself is longer in proportion to the raceme, and its leaves are glaucous olive-green above and glossy purple underneath with a purple margin and they are thin and leathery, not bright green and succulent as in *E. zeyheri*.

It occurs in rendzina and red-clay soils over limestone in communities where grass and small ericoid shrublets are most frequent. In the localities quoted above no outstanding variants of the species were present.

Var. **pallidum** Archibald var. nov. Fig. 8. Foliis infra pallidis, floribus majoribus distinguitur.

Plants flowering in February, leaves following and still present in October. *Tubers* slightly larger and with thinner skin than in type occurring 10—20 cm. below ground, irregularly cylindrical, with long sinuous underground shoot surrounded by a few membranous sheaths. *Leaf* reniform or broadly ovate with cordate base, obtuse or acute, leaf-sheath may or may not be exserted; lamina prostrate or ascending, upper surface greyish green with faint red margin, lower surface pale green or golden brown with red veins. *Peduncle* basal sheath exserted about 4 cm.; purple above white below; bract up to 4·5 cm. long, elliptic, greyish green on both sides, sometimes with purple tinge at base on under side, margin red. *Perianth* showy, general colouring creamish yellow with dark brown or greenish veins and purple tips, with a faint scent of coltsfoot oil, segments slightly larger than in type, reflexed during morning, closing somewhat at night; outer spatulate, angular above with narrow base, inner inflected spatulate. *Stamens.* Filaments larger than in type, outer broadly ovate, acuminate above; inner more or less oblong, acuminate above. *Gynoecium* slightly larger than type.

EASTERN CAPE PROVINCE. Albany Division, hill behind Willshire Crescent, Grahamstown, *Archibald* 7218, 7454 a and b; Gowie's Kloof, Grahamstown, *Archibald* 7457; Alexandria Division, Zuurberg Pass, on Dwyka shale, *Archibald* 7239, 7255, 7422.

This variety occurs on shale and on sandy soil derived from Witteberg quartzite. It occurs between bush clumps or where southern aspects favour grass associated with bush clumps. In the Willshire Crescent area it has persisted, together with *E. lancaefolium* var. *orthophyllum*, in spite of invasion by pine trees.

Var. **stoloniferum** Archibald var. nov. Fig. 9. Tuberibus stoloniferis distinguitur.

Plants flowering in February, leaves occurring from May—October. *Tubers* solitary or compound reproducing by stolons up to 12 cm. long

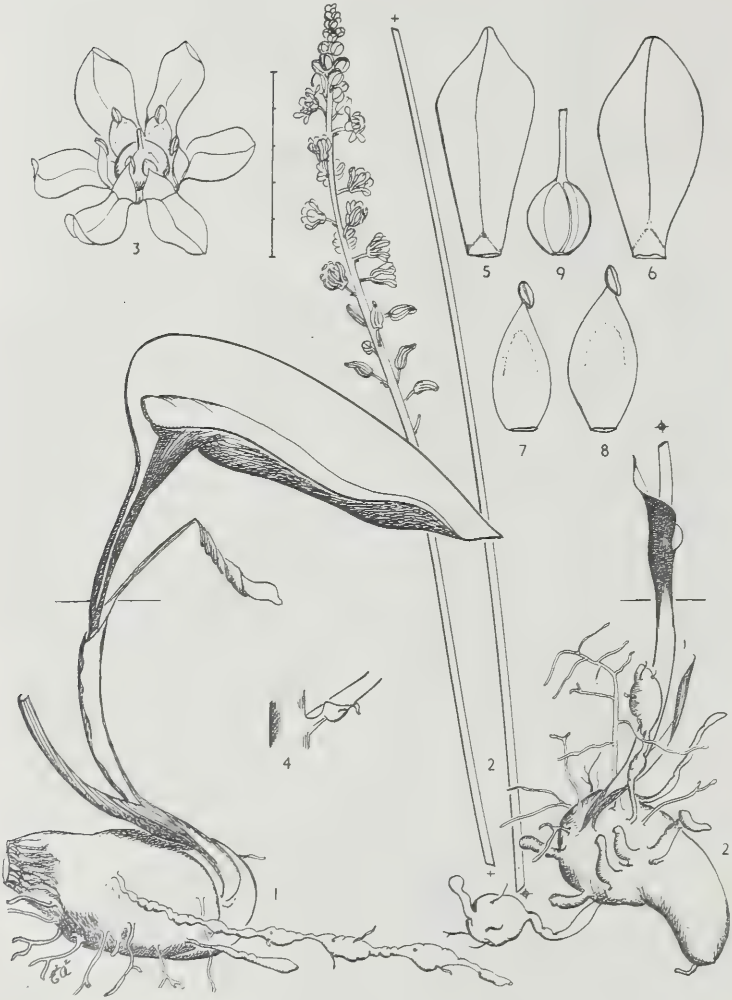

FIG. 9.—*Eriospermum porphyrium* var. *stoloniferum*, Archibald. 1, Plant in leaf; 2, plant in flower; 3, flower viewed from above; 4, bract at base of pedicel; 5, outer segment; 6, inner segment; 7, outer stamen; 8, inner stamen; 9, gynoecium. 1 and 2, scale = 5 cm.; 3 and 4, scale = 1 cm. (approx.); 5—9, scale = 5 mm. *Del.* E. E. A. A.

upon which small tubers are formed in bead-like succession, outer skin rough, brown, not as horny as in type. *Leaf* orbicular, cordate, apex acute, basal sheath generally exserted 1—4 cm. above ground level; lamina horizontal forming a funnel at juncture with petiolar base, dark glaucous green above, purple below, with or without red margin. *Perianth* intermediate in size, shape and colour between type and var. *pallidum* and with a similar scent. *Stamens.* Filaments elliptic, acuminate, the inner 4 mm. long, 2 mm. wide at middle, the outer slightly smaller. *Ovary* spherical, about 1·7 mm. diam., green; style as long or slightly longer than ovary, filiform, white; stigma pappilose, slightly broader than style.

EASTERN CAPE PROVINCE. Alexandria Division, Whitney Farm on slopes above Bushman's River, *Archibald* 5812 (type in Albany Museum Herbarium).

This variety occurs on soil derived from Beaufort Shale. The surrounding vegetation is composed of sclerophyllous bush such as *Randia rudis*, *Grewia occidentalis* and *Scutia myrtina*.

7. **Eriospermum lancaefolium** Jacq. Coll. Suppl. V, 72, 1796; Ic. t. 421, 1794. Var. **orthophyllum** Archibald var. nov. Fig. 10.

Tubere solitario, folio erecto lanceolato-oblongo, vagina laminae et pedunculi paulo hirsuto, bractea pedunculi lanceolata, racemo laxo distinguitur.

Plants hysteranthous, flowers January and February, leaves May—July. *Tuber* solitary, when young pyriform, becoming irregularly cylindrical with age, up to 5 cm. long, 3 cm. diam., generally horizontal, growing point basal or lateral, with or without lateral groove, outer skin thin, dark brown, inner flesh pink, with red vesicles in older parts, paler towards growing point, base of shoot surrounded by a few soft membranous sheaths of previous years' growth. *Leaf* solitary, erect; leaf-sheath up to 10 cm. long, 1—2 mm. diam., exserted for about half its length, wiry, tinged with red, sparsely pubescent or glabrous; lamina lanceolate-oblong, up to 9 cm. long, 2·5 cm. broad, with acuminate base and apex, pale green, somewhat glaucous, dorsal surface occasionally shiny, glabrous or in exposed situations with a few hairs at base of dorsal surface, occasionally when dried with a few short reddish lines appearing on dorsal surface, margin entire, generally purplish red, occasionally with a few scattered hairs. *Peduncle* erect, 18—36 cm. long, 1—2 mm. diam., glaucous, glabrous; basal sheath ribbed, sparsely pubescent or sometimes glabrous; bract exserted, erect, cordate-lanceolate, 1—1·5 cm. long, 4—7 mm. broad, glabrous, green. *Raceme* 3—12 cm. long, with 10—20 flowers, loose; bracts 1 mm. or less, lowest saccate; pedicels spreading, arcuate, lowest 1—5 cm. long, upper about half as long, wiry, glaucous,

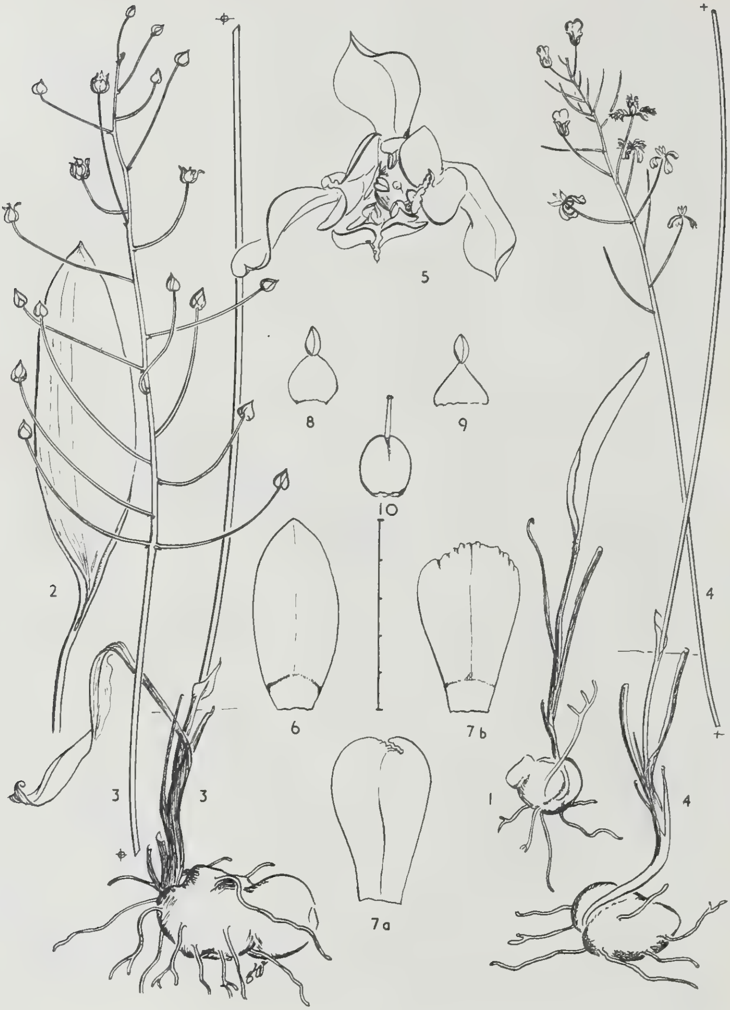

Fig. 10.—*Eriospermum lancaefolium* var. *orthophyllum*, Archibald. 1, Plant from grassveld in leaf; 2, leaf from plant under pine trees; 3, plant in flower in cultivation; 4, plant in fruit from grassveld; 5, flower viewed from above; 6, outer segment, extended; 7, inner segment (a) naturally folded, (b) partly extended; 8, outer stamen; 9, inner stamen; 10, gynoecium. 1—4, scale = 5 cm.; 5—10, scale = 5 mm. *Del.* E. E. A. A.

glabrous. *Perianth* 4—5 mm. long, triangular, opening in the afternoon; segments dimorphic, connate at the base for nearly 1 mm., outer up to 6·5 mm. long, 3 mm. broad, elliptic, spreading, with upper half erect, green with dark purplish apex and purplish brown vein; inner up to 5 mm. long, 3·5 mm. broad, erect, very broadly spatulate when extended, in natural position upper part folded forming a keel, retrorse, margin occasionally slightly fimbriate, white or cream above shading to green below with purplish brown vein. *Stamens* erect; filaments joined to segments for about 1 mm., free part about 1 mm. long, at base equal in width to segments, white, outer ovate-deltoid, inner deltoid; anthers introrse, shorter than filaments. *Ovary* about 2 mm. diam., 1·5 mm. long, broadly ovoid, green; style as long as ovary, about 0·5 mm. thick, green; stigma rounded, slightly papillate. *Capsule* about 6 mm. long, apex depressed, carpels irregularly lobed. *Seeds* about 2 mm. long, covered with white silky hairs.

EASTERN CAPE PROVINCE. Albany Division, hill above Willshire Crescent, *Archibald* 7235, 7412, 7417, 7417b (type in Albany Museum Herbarium); Mayor's Seat, Mountain Drive, *Dyer* 834; West Hill Station, *Dyer* 515. Alexandria Division, Kolsrand Road, ½ mile from National Road, *Archibald* 3333, 3333b, 7436; Alexandria Road, 1 mile from Nanaga, *Archibald* 7371; Quagga Vlakte, *Archibald* (without number).

Foliar characters which distinguish *E. lancaefolium* var. *orthophyllum* from the type are its small, erect leaf and thin, wiry leaf-sheath which is generally finely pubescent. A good distinguishing character of the inflorescence is the peduncular bract. This is exserted, erect and broadly lanceolate merging into a finely pubescent peduncular sheath, whereas in the type species the sheath is glabrous and the bract is shortly ovate and retrorse being almost hidden at ground level by the thick remains of previous sheaths. The inflorescence in the type varies from a subsessile somewhat secund spike to a lax raceme with the lower pedicels up to 4·5 cm. long. Salter[13] has observed that the short pedicelled forms "alone seem to occur in shady situations". In *E. lancaefolium* var. *orthophyllum* the raceme is never spike-like but always lax, moreover plants growing in shady situations tend to be more vigorous with longer pedicels. The filaments of the type have been described by Jacquin[6, 8] and Baker[1] as lanceolate, but in herbarium material of the species that I have dissected I have always found them to be deltoid and very similar to those of var. *orthophyllum*. Finally, the ovary of this new variety is not punctate as it is in the type species.

E. lancaefolium has not been recorded from the Eastern Cape but other species which do occur and which might be confused with the variety *orthophyllum* are *E. bifidum* and *E. dissitiflorum*. The former is clearly distinguished by its tubers which have white flesh and by its flowers which are rotate with bifid filaments. While the latter is distinguished by its long spicate inflorescence and by its leaf which is laxly spreading and generally ovate-cordate with an obtuse apex.

The specific epithet "erectifolium" was used for this plant by Dr. R. Marloth on two herbarium sheets of specimens sent to him by Dr. R. A. Dyer (Dyer 834 and 515), but this name was never published.

E. lancaefolium var. *orthophyllum* is a grassveld species. In the Alexandria Division it occurs on red sandy soils over limestone in communities where *Sporobolus capensis* and *Eragrostis* spp. are common with such small shrubs as *Chrysocoma tenuifolia* and *Aster filifolius*. It also occurs on silcrete soils in the Albany Division where grassveld has been invaded by Rhenosterbos. On the hillsides around Grahamstown it flourishes on sandy quartzitic soils where grass is now overgrown by pine trees. In shady communities such as these the largest and most vigorous inflorescences are produced.

8. **Eriospermum thyrsoideum** Baker. Fl. Cap. VI, 375, 1896. Fig. 11.

Plants hysteranthous, flowers January or February, very dependent on rains, inflorescence growing very rapidly and flowering period lasting only about a week. Leaves April—October. *Tubers* solitary or frequently compound, increasing by direct budding with six or more together, occurring 5—10 cm. below soil surface, irregularly cylindrical, sometimes kidney-shaped, generally vertical, up to 7 cm. long, 5 cm. diam. at base, compound tubers correspondingly larger; outer skin corky brown, inner flesh bright pink, sometimes with orange vermiculations; growing point at base; shoot ascending in a lateral groove, surrounded by numerous old hard leathery leaf-bases which form a trumpet-like sheath terminating abruptly at ground level. *Leaf* one or very occasionally two from each growing point; leaf-sheath 2—4 mm. diam., soft, bright pink at ground level shading to white below, in exposed situations not exserted but if sheltered then exserted up to about 4 cm. and frequently with a sausage-shaped swelling at ground level; lamina prostrate or, when sheltered, erect or spreading, orbiculate-cordate or ovate-cordate, sometimes acuminate, up to 7 cm. long, up to 6 cm. broad; upper surface glaucous, leathery, glabrous with slight longitudinal undulations, when dried spongy and peppered with minute brown spots; under surface paler green, sometimes longitudinally striped with dark rose pink, glabrous, when dried smooth, not spotted; apex rounded or obtuse, sometimes very shortly mucronate; margin entire, red or concolorous, in sun forms somewhat curled back. *Peduncle* erect, wiry, up to 18 cm. long, about 1·5 mm. diam., glaucous, olive-green or brown, glabrous, pruinose; basal sheath

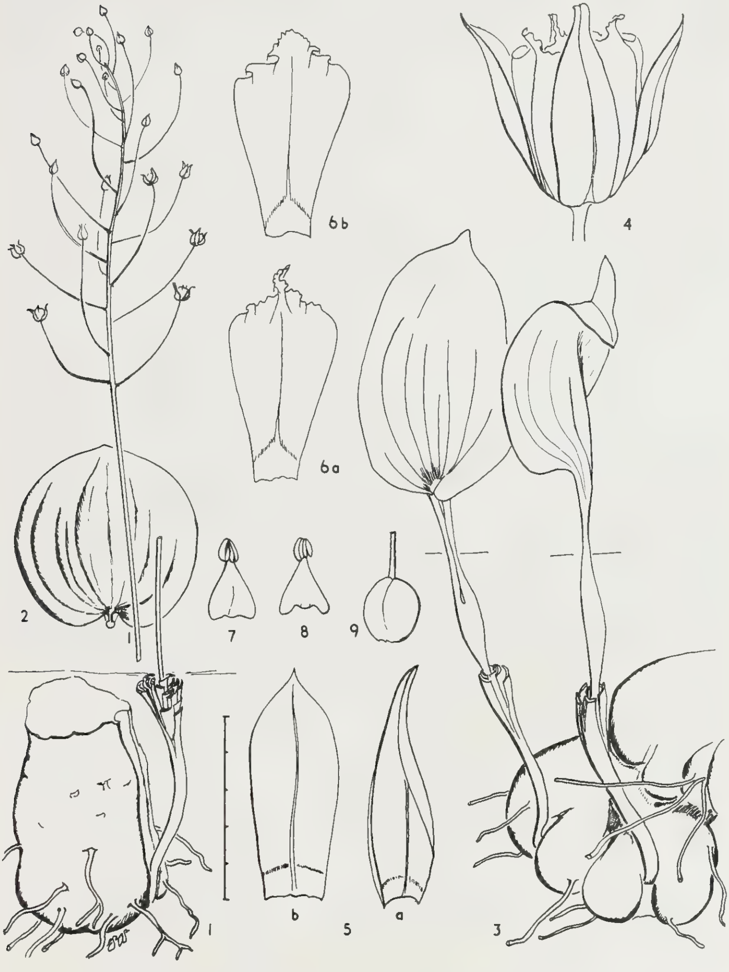

Fig. 11.—*Eriospermum thyrsoideum*, Baker. 1, Plant in flower; 2, orbicular leaf; 3, plant with compound tuber and ovate leaves; 4, side view of flower; 5, outer segment (a) naturally folded, (b) extended; 6, inner segment (a) naturally folded, (b) partly extended; 7, outer stamen; 8, inner stamen; 9, gynoecium. 1—3, scale = 5 cm.; 4—9, scale = 5 mm. *Del.* E. E. A. A.

glabrous, white below, liver-brown at ground level, not exserted; bract small, almost or entirely hidden at ground level by old basal sheaths, about 3 mm. long, equally broad, cordate-ovate, retrorse, glabrous, reddish or liver-brown, hard, apex beak-like, acute. *Raceme* generally equal in length to peduncle with up to 45 flowers, loose; bracts 1 mm. or less, saccate, reflexed, grey, coriaceous; pedicles spreading, arcuate, rigid, about 0·5 mm. diam., lowest up to 5 cm. long, uppermost about one-third as long, glabrous, olive-brown. *Perianth* triangular, about 6 mm. wide, segments dimorphic, connate at base for nearly 1 mm.; outer segments up to 6·5 mm. long, about 2 mm. broad, spreading at about 40° to axis, oblong or elliptic, abruptly acuminate, acute, upper quarter retrorse, apex incurved, margins folded inwards, cream shading to khaki with narrow greyish brown vein, inner surface paler, upper part finely spotted with maroon; inner segments slightly shorter than outer, up to 3 mm. broad, erect, when extended very broadly spatulate, lower part cream spotted with maroon, vein greyish brown, upper sixth when in natural position folded backwards forming a retrorse acute apex with translucent margin entire or finely fimbriate, tip white. *Stamens.* Filaments joined to segments for about 1 mm. at base, free part deltoid, about 1·5 mm. long, base about 1 mm. broad, the inner filaments slightly smaller, orange-yellow or mustard coloured; anthers about 0·5 mm. long, yellow, introrse. *Ovary* almost spherical, 1·5 mm. diam., green; style as long as ovary, filiform, white; stigma minutely papillate. *Capsule* about 6 mm. long, more or less cylindrical, surrounded at base by persistent perianth parts, brownish purple when ripe, open capsule with bilobed, saccate, strongly reflexed carpels, dry outer perianth segments reflexed, inner erect. *Seeds* covered with silky white hairs.

EASTERN CAPE PROVINCE. Somerset East Division, stony ground on Bruintjes Hoogte, *MacOwan* 1863, 2198 (type at Kew, co-types of 2198 in Albany Museum Herbarium and Kirstenbosch Herbarium). Uitenhage Division, Uitenhage, *Pappe*, Herb. Mus. Austro-Afric. 22813, *Zeyher* 537. Port Elizabeth Division, south side Bethelsdorp Salt Pan (coll. C. Moodie), *Archibald* 7374, 7415; Albany Division, Botha's Ridge nr. Grahamstown, *Archibald* 7198 a, 7254 a, 7363, 7399; 6 miles along Cradock Road, from Grahamstown, *Dyer* 556. Alexandria Division, nr. De Hoop, *Archibald* 7442, 7453; Payne's Farm nr. Bushman's River Poort, *Archibald* 7202 a, c, d.

Type specimens of *E. thyrsoideum* were collected by MacOwan in the Somerset East Division in 1879. Zeyher and Pappe had found it in the Uitenhage Division but it had been identified as *E. latifolium* Jacq. now known as *E. capense* (L.) Salter. Since then it has been practically unknown although it is one of the commonest species in the Eastern Cape.

Possibly it has been overlooked because the fine thread-like inflorescence harmonizes so well with its surroundings and only lasts for a short time.

In most localities where it is found *E. thyrsoideum* occurs in stony ground with red clay soil which dries out and becomes very hard during summer months. The surrounding vegetation consists of succulent and thorny shrubs and many geophytes and low ericoid shrublets including *Pentzia* spp. However, it also occurs in sandy soils on limestone ridges, as in the Alexandria Division, where *Chrysocoma tenuifolia* is a common shrublet in grass communities.

E. thyrsoideum is very closely related to *E. capense* (L) Salter[2, 9, 13], having a similar type of inflorescence and dimorphic flowers. However, its floral segments are longer and consequently narrower looking and are less noticeably joined at the base than in *E. capense*. Its leaves are on the whole smaller and more generally orbicular, having a leathery texture and being dark grey-green in colour. The difference in the leaves of the species becomes more apparent when they are dried. The upper surface of those of *E. thyrsoideum* is then "spongy" and peppered with very fine brown spots, while in *E. capense* the "spongy" quality is not present and the spots are larger. The lower surface in *E. thyrsoideum* is smooth and unspotted whereas in *E. capense* short longitudinal brown lines are visible.

With the evidence so far available it has been thought best to treat *E. thyrsoideum* and *E. capense* as distinct species. But it is quite possible that a close comparison of fresh material from various localities ranging from the Peninsula to the Eastern Cape will show that *E. thyrsoideum* is merely an arid form of the first named species of the genus.

9. **Eriospermum cordiforme** Salter. Journal S. Afr. Bot. VII, 106, 1941. Fig. 12.

Plants hysteranthous, flowers February—March, leaves April—September or later. *Tubers* solitary or compound, increasing by direct budding but seldom more than three together, more or less slipper-shaped when young but developing into warty irregular masses with numerous tuberculate root-bases, up to 8 cm. across, 4 cm. or more thick, occurring from 5—12 cm. below ground level, growing points on upper surface or lateral (according to Salter, lateral or basal), lateral groove not always present; outer skin brown, thin when young, becoming thick and warty with age; inner flesh of young tubers pale pink, that of old ones bright pink spotted with minute red vesicles and with vermiculate opaque patches; base of shoot surrounded by a few soft, membranous, black or russet-brown leaf-bases 2—4 cm. long. *Leaf* one from each growing point; leaf-sheath about 5 mm. diam., fleshy, glabrous or hirsute, deeply grooved

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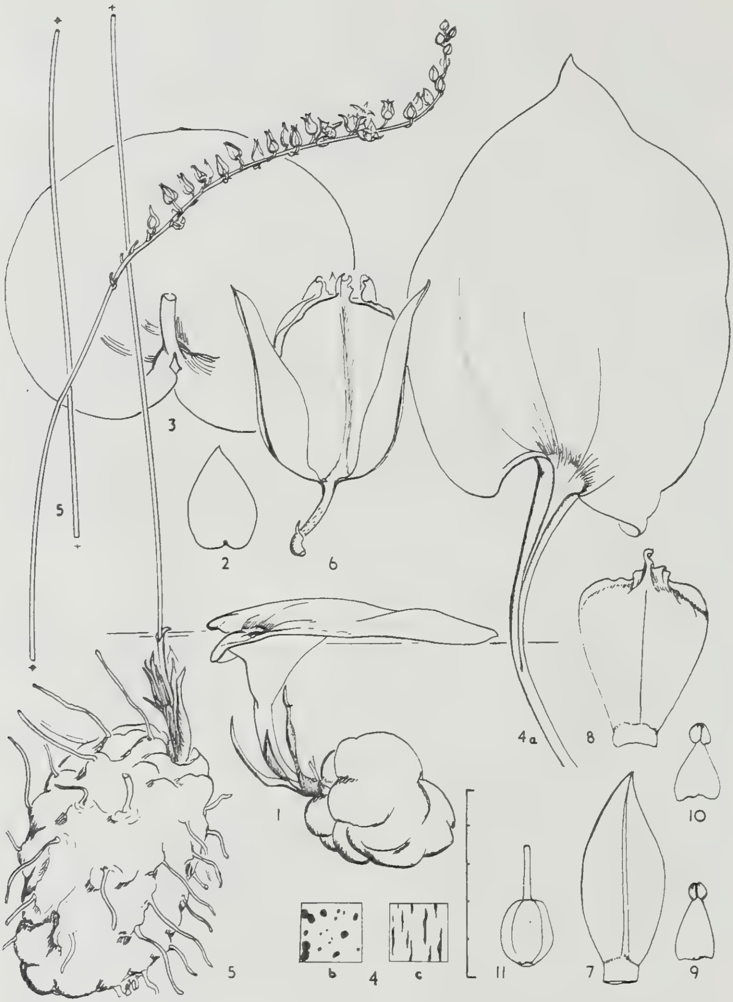

Fig. 12.—*Eriospermum cordiforme*, Salter. 1, Plant in leaf; 2, juvenile leaf; 3, orbicular leaf from exposed locality; 4, (a) ovate leaf from locality sheltered by pine trees; (b) and (c) spots and lines on upper and lower surface of dry leaf; 5, plant in flower; 6, side view of flower; 7, outer segment; 8, inner segment; 9, outer stamen; 10, inner stamen; 11, gynoecium. 1—5, scale = 5 cm, except 4 b and c which show about 9 sq. mm. enlarged; 6—11, scale = 5 mm. *Del.* E. E. A. A.

in upper half, light green above shading to white below, generally about 4 cm. long, not exserted unless sheltered, then up to 11 cm. long, the upper half exserted, erect or flexuose; lamina glabrous, generally prostrate, orbiculate-cordate, up to 9 cm. diam., but when sheltered ascending, ovate-cordate, up to 16 cm. long, up to 13 cm. broad, soft, thin, slightly transversely wrinkled, light glaucous green on both sides, when dried upper surface is marked with numerous reddish brown spots up to 0·5 mm. in diam., on the under surface lines about 1 mm. long, of a similar colour, are apparent; apex slightly acute, obtuse or obscure; margin with or without thin red line, entire or lower half sometimes undulating. *Peduncle* erect, wiry, about 1·5 mm. diam., up to 55 cm. long, glabrous, pale liver-coloured; basal sheath glabrous, very pale green shading to white below; bract only just visible at ground level, 4—5 mm. long, cordate-ovate, glabrous, light reddish brown, apex retrorse, acute. *Raceme* up to 12 cm. long with up to 28 flowers, dense, spicate, secund; bracts up to 2 mm. long, lower part clasping pedicle, upper part acuminate, acute, incurved or retuse, pinkish grey with darker markings; pedicels subequal, 2—7 mm. long, glabrous, pale pink. *Perianth* about 5·5 mm. long, triangular; segments dimorphic, connate at base for less than 1 mm., outer up to 5·5 mm. long, about 2 mm. broad, elliptic, acute, arcuate, cream with broad brownish vein suffused with minute red spots at base, apex retrorse, margins infolded; inner slightly shorter, erect, about 3 mm. broad, very broadly spatulate when extended, in natural position upper fifth folded backwards forming a finger-like apex, translucent with greenish cream base, vein dark brown, narrow, margin entire or very slightly fimbriate in upper part. *Stamens.* Filaments joined to base of segments for about 1 mm., upper part about 1·5 mm. long, ovate-deltoid, white, inner slightly smaller than outer; anthers one-third to three-quarter length of filaments, yellow, introrse. *Ovary* ovoid, about 2 mm. diam., green; style equal in length to ovary, filiform, white; stigma truncate. *Capsule* about 6 mm. long, pyriform or turbinate, surrounded by persistent perianth parts, carpels strongly reflexed when open. *Seeds* about 2 mm. long covered with white hairs.

WESTERN CAPE PROVINCE. Cape Peninsula, nr. Milnerton, *Salter* 8351 (type in Bolus Herbarium, co-type Nat. Bot. Gard. Herb.), Devil's Peak, *Salter* 8492; Camp Ground, *Salter* 8474; Camp's Bay, *Salter* 8428. Caledon Division, *Bolus*, Nat. Bot. Gard. Herb. 1175/30. Swellendam Division, *Marloth* 12947. Riversdale Division, *Andreae* 1139.

EASTERN CAPE PROVINCE. Port Elizabeth Division, Kabega Park, road between Kragga Kama and Cape Road (coll. C. Moodie), *Archibald* 7375; Baakens River Valley nr. Hallack Road (coll. C. Moodie), *Archibald* 7384b. Alexandria Division, Waaiheuwel, *Archibald* 7337, 7446; Kolsrand, *Archibald* 3996.

Broadly speaking, this species is distinguished from *E. capense* by its densely spicate secund inflorescence and from *E. dyeri*, *E. lanuginosum* and *E. pubescens* by its glabrous leaves. The appearance of very conspicuous spots on the leaves when dried is a character which has been previously overlooked, not only in this species but also in *E. capense*, *E. pubescens* and *E. thyrsoideum*. All these species, because of their variability, deserve closer study so that intermediate forms can be clearly distinguished.

It is possible that *E. cordiforme* was the origin of the earlier name *E. bellendeni* Sweet, the secund inflorescence being a noticeable point of similarity. However, I concur with other authors in considering that *E. bellendeni* Sweet is a *nomen nudum* as there is no type material of it in existence. The figure (Bot. Mag. t. 1382) to which this name was attributed is of a plant, erroneously described by Gawl as *E. latifolium*, Jacq., from cultivated material without record of original collector or locality.

In the Eastern Cape *E. cordiforme* occurs in sandy quartzitic soil where species of *Thamnochortus*, *Cyperus*, *Erica* and *Leucospermum* give the communities a Western Province character. However, being somewhat beyond the true winter-rainfall area, the general aspect of the vegetation would seem very impoverished to a botanist from the west. Nevertheless, this *Eriospermum* flourishes and although the communities are not large the species is frequent in one locality. In a region now invaded by pine trees it has persisted, the form of the leaf changing slightly, the leaf-sheath being exserted and the lamina ascending, lax and ovate-acuminate instead of orbicular-cordate as in natural communities.

10. **Eriospermum dissitiflorum** Schlechter, Journ. Bot. vol. 34, p. 394, 1896; Fl. Cap. VI, Addenda, p. 535, 1897. Fig. 13.

Plants hysteranthous, flowers January, leaves February to about September, non-flowering plants produce leaves earlier. *Tuber* solitary, young tubers spherical becoming irregularly cylindrical with age, up to 8 cm. long, 3·5 cm. diam., horizontal, occurring up to 8 cm. below ground, outer skin corky, inner flesh pink, tough, shoot from apical or lateral growing point, no lateral groove present, base of shoot short or, when growing in long grass, sinuous and elongated, surrounded by persistent leaf-sheaths which are soft, membranous, light brown, 2—20 cm. long according to habitat. *Leaf* solitary; leaf-sheaths up to 20 cm. long, 1—2·5 mm. diam., the upper third or two-thirds exserted, lax, glabrous, pale green shading to white at base; lamina spreading or pendent, in long grass

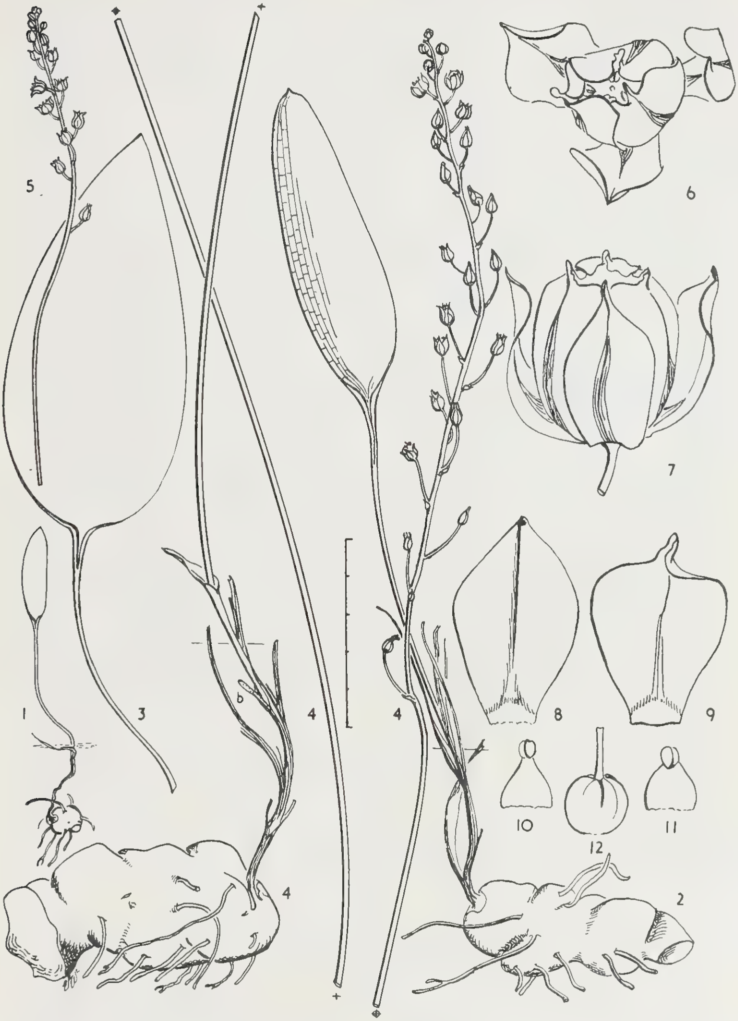

Fig. 13.—*Eriospermum dissitiflorum*, Schltr. 1, Juvenile plant; 2, adult plant with oblong leaf; 3, ovate leaf; 4, plant with mature inflorescence, (b) young leaf emerging through old leaf sheaths; 5, part of young inflorescence; 6, flower, viewed from above; 7, side view of flower; 8, outer segment; 9, inner segment; 10, outer stamen; 11, inner stamen; 12, gynoecium. 1—5, scale = 5 cm.; 6—12, scale = 5 mm. *Del.* E. E. A. A.

or dense shade elliptic-oblong, up to 20 cm. long, about a quarter to a third as broad as long, amongst rocks and shrubs under trees ovate, up to 15 cm. long, about three-fifths as broad as long, light green on both sides, occasionally glaucous, thin, glabrous, longitudinal veins slightly prominent, lateral veins becoming more conspicuous on drying, apex obtuse, shortly mucronate, margin entire. *Peduncle* flexuous, up to 72 cm. long, 2—4 mm. diam., green, shading to white with maroon spots at base, glabrous; basal sheath membranous, slightly ribbed, light brown, subterranean or in long grass exserted to just above dead sheaths of grass, up to 15 cm. long; bract at ground level or, in long grass, carried up by sheath to level where tussock opens out, erect, lanceolate, acuminate, 5—25 mm. long, up to 7 mm. broad, green, or in long grass pale with brown flecks, glabrous. *Raceme* up to 20 cm. long, elongating as fruit ripens, spicate, with up to 35 flowers, internodes up to 25 mm. long, occasionally only 4 mm. long; bracts about 2 mm. long, slightly saccate, membranous with a dark vein; pedicels rigid, ascending, arcuate, lowermost about 7 mm. long elongating up to 15 mm. as raceme extends with opening of upper flowers and ripening of fruit, glabrous, similar in colour to peduncle. *Perianth* triangular, about 5 mm. long; segments dimorphic, joined for about 1 mm. at base, outer up to 5 mm. long, 3 mm. broad, elliptic, erect, arcuate, pinched in towards apex, white with brown-tipped vein shading to green below; inner equal to or slightly shorter than outer, up to 3·5 mm. broad, erect, very broadly spatulate when extended, in natural position upper sixth folded backwards forming a finger-like apex, translucent white with broad green vein, margin entire becoming serrate in upper sixth. *Stamens.* Filaments white, joined to segments about 1 mm. from base, free part about 1·5 mm. long, equal in width to segment at base, deltoid; anthers less than 1 mm. introrse. *Ovary* spherical, about 1·5 mm. diam., green; style equal in length to ovary, cylindrical, less than 1 mm. diam., white; stigma truncate, slightly papillate. *Capsule* about 8 mm. long, 6 mm. diam. at top, globose or broadly obovate, surrounded by persistent remains of perianth parts which have elongated somewhat, apex scarcely depressed, carpels rounded at top or very slightly bilobed. *Seeds* 3—4 mm. long, comma-shaped, covered with long silky white hairs which turn brown with age.

EASTERN CAPE PROVINCE. Queenstown Division, among rocks summit of Queenstown Range, *Galpin* 1944 (co-types in Bolus Herbarium and Albany Museum Herbarium). Somerset East Division, in grass among rocks, Boschberg Mountains, *MacOwan* 1823. Albany Division, south slope, Botha's Ridge, Penrock Farm, 8—10 miles from Grahamstown, *Dyer* 567; south side Botha's Ridge, Glencraig Farm, *Archibald*

7472. Alexandria Division, Zuurberg near Somerset East boundary, *Archibald* 7421; Beacon Ridge near Zuurberg Inn, *Archibald* 7237.

E. dissitiflorum is distinguished from other species with elongated leaves and red tubers by its spicate inflorescence and obtuse, mucronate leaves. It was first described by Schlechter from specimens collected by Galpin in January 1896 at the summit of the Queenstown Range. According to Schlechter the leaves are contemporary with the flowers and the perianth segments are oblong. From my examination of Galpin's specimens in the Bolus and Albany Museum Herbaria, I can find no evidence of the leaf and inflorescence occurring simultaneously on the same tuber. Neither Dyer's not MacOwan's specimens support Schlechter's statement, and in the three localities where I have collected this species I have never seen leaf and inflorescence occurring together on the same plant. What I have noted, however, with this and other species of *Eriospermum*, is that a plant which has not flowered during the current season produces its leaf early. Thus when the majority of plants are in flower a few in the same locality have fully formed leaves. The leaf, however, does develop very rapidly after flowering has finished, and the specimen illustrated (Fig. 13. 4b) shows a plant in flower with a small shoot breaking through the sheath preparatory to forming a leaf.

With regard to the perianth segments, they are clearly dimorphic in Galpin's specimen, the outer elliptic, and the inner very broadly spatulate. This is also true for the other specimens quoted above. However in common with other species of *Eriospermum*, the perianth persists and elongates somewhat as the fruit ripens. I can only suggest then that it was from old flowers at the base of the inflorescence that Schlechter wrote his description.

In the Alexandria and Albany Districts *E. dissitiflorum* grows on steep southern slopes where grasses such as *Miscanthidium*, *Anthoxanthemum*, *Digitaria* and *Festuca*, together with a species of *Restio*, form dense tussocks on ledges and slopes between outcrops of Witteberg quartzite. In such situations where tubers occur under or adjacent to grass tussocks, the leaf is elliptic-oblong, and the shoot forces its way through the tussock to the light. The leaf-sheath is long and sinuous, the peduncle bract hidden from view by the grass and the inflorescence very long and flexuous. This form also occurs in crevices of overhanging rock faces protected by bush, in which case the leaves may be pendent. As one moves along the contour of the slope into a depression where trees such as *Brachylaena* and *Olea* are common, the grass gives place to small shrubs and herbs with more open soil surface. Here the ovate-leaved form can be found with shorter leaf-sheath and peduncle bract at ground level. This form is like the type material that Galpin collected in the Queenstown mountains.

11. **Eriospermum dyeri** Archibald sp. nov. Fig. 14. Tuberibus multiplicibus carnosis rubris, foliis planis orbiculato-ovatis hirsutis, racemis spicatis, segmentis dissimilibus distinguitur.

Planta hysterantha. *Tubera* parvula pyriformia foliis solitariis, vetusta informia, ramosa, multiplicia foliis circa octo, 5—7 cm. crassa, usque ad 30 cm. diam., intus carnosa rubra. *Folium.* Vagina ad 15 cm. longa, 3 mm. diam., summa hirsuta, inferior glabra; lamina plana, orbiculato-cordata, usque ad 7 cm. diam., utrimque glauco-viridis, dense pilis argenteis tecta. *Pedunculus* erectus rigidus, usque ad 44 cm. longus, 2 mm. diam., glaber; vagina glabra; bractea cordata, 3 mm. longa, 3 mm. lata, retusa, glabra, margine fimbriata. *Racemus* usque ad 12 cm. longus, spicatus, 20—30 floribus, pedicellis infimis 8 mm. longis, sed circa 14 mm. longis cum fructibus, summis circa dimidio minus. *Perianthemum* circa 5 mm. longum; segmenta dissimilia, exteriora 5—6 mm. longa, 1—2 mm. lata, elliptica, arcuata, summa recurva; interiora 4·5—5 mm. longa, 3 mm. lata, erecta, latissima spatulata, apice plicato, retrorso, retuso, margine serrato. *Filamenta* basi adnata, parte libera 1·5—2 mm. longa, exteriora ovato-deltoidea, interiora deltoidea. *Ovarium* 2 mm. diam.; stylus cylindricus, 1 mm. longus.

EASTERN CAPE PROVINCE. Alexandria Division, Kamtra River Valley, *Archibald* 5753 b. 6180 (type in Albany Museum Herbarium), *Archibald* 7471; 28—29 miles from Grahamstown on road to Alexandria, *Dyer* 951; Zuurberg Mountains, nr. Somerset East boundary, *Archibald* 7466. Albany Division, Carls Rust Farm, Highlands, *Dyer* 609. Somerset East Division, Boschberg Mountains, *MacOwan* 1822.

Plants hysteranthous, flowers January—March, leaves March—November, plants without flowers have been found in leaf in January. Old leaves dry out and persist in a well-preserved condition for the following season. *Tuber* pyriform when young, increasing by direct budding and becoming compound forming an irregular compact mass 5—7 cm. thick and up to 30 cm. diam., occurring on banks or under rock ledges, close to surface of soil or slightly exposed, outer skin horny, brown or silvery grey when exposed, inner flesh juicy, purplish red. *Leaf* one per season from each growing point, compound tubers with eight or more; leaf-sheath short, or in long grass and under rock ledges up to 15 cm. long, 3 mm. diam., exserted, prostrate, upper part grey-green, pubescent, lower part white, glabrous; lamina prostrate, orbicular-cordate, up to 7 cm. diam., on both sides pale grey-green and thickly covered with silvery hairs, apex obtuse. *Peduncle* erect, rigid, up to

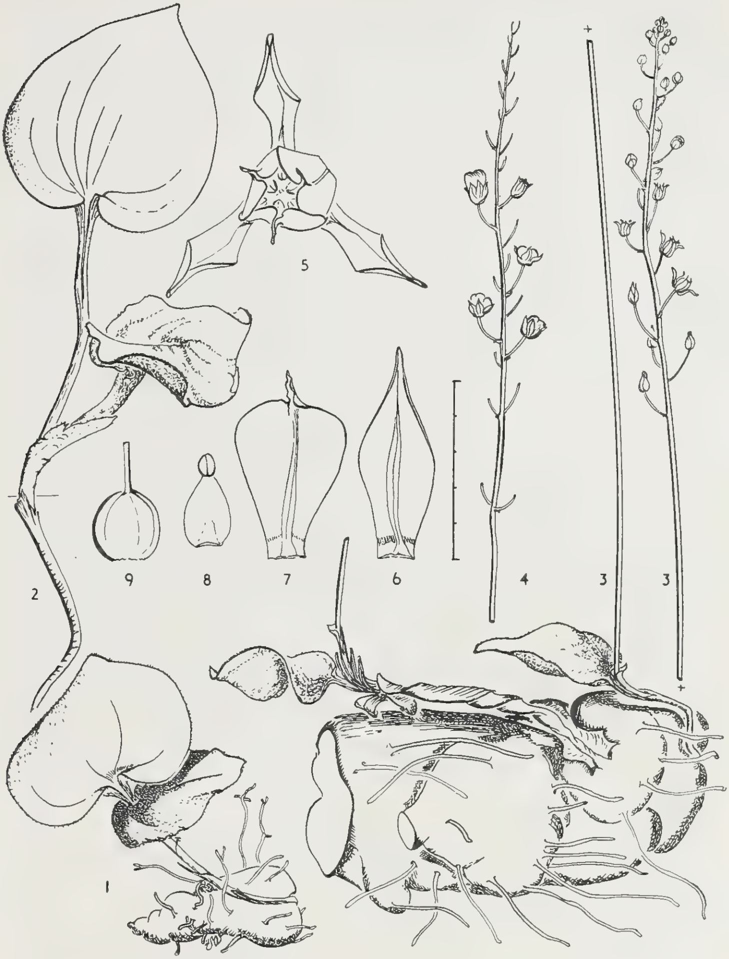

FIG. 14.—*Eriospermum dyeri*, Archibald. 1, Juvenile plant in leaf; 2, adult leaf with a long leaf-sheath; 3, part of compound tuber with inflorescences (note persistent leaf of previous season in Figs. 1—3); 4, inflorescence with fruit; 5, flower, viewed from above; 6, outer segment; 7, inner segment; 8, stamen; 9, gynoecium. 1—4, scale = 5 cm.; 5—9, scale = 5 mm. *Del.* E. E. A. A.

44 cm. long, about 2 mm. diam., olive-green above shading to reddish brown below, glabrous, slightly shiny; basal sheath reddish, glabrous; bract appearing at ground level or hidden by remains of previous season's leaf, cordate, broadly ovate, retrorse, apex acute, margin finely fimbriate. *Raceme* up to 12 cm. long, elongating as fruit ripens, with 20—30 flowers, spicate; lowermost bracts 2 mm. long, saccate, membranous, white with reddish brown vein; pedicels wiry, arcuate, 0·5 mm. diam., lowest about 8 mm. long, elongating to about 14 mm. as fruit ripens, uppermost about half as long, brownish green, glabrous. *Perianth* about 5 mm. long, triangular; segments dimorphic, free almost to base, the outer 5—6 mm. long, 1·5 mm. broad, arcuate, elliptic, upper part with infolded margins, white with purple-brown vein shading to green at base; the inner 4·5—5 mm. long, 3 mm. broad, erect, very broadly spatulate with upper sixth folded backwards forming an acute retrorse apex, white with broad purple-brown vein, margin slightly serrate above. *Stamens* erect; filaments joined to base of segments for about 1 mm., free part about 2 mm. long, at base almost as broad as segments, white, ovate, the inner less sharply acuminate than the outer; anthers about 0·5 mm. long, introrse. *Ovary* about 2 mm. diam., spherical, green; style cylindrical, about 1 mm. long, introrse; stigma truncate. *Capsule* about 5 mm. long, broadly obovate, surrounded by persistent perianth parts, brownish purple when ripe. *Seeds* about 1 mm. long, comma-shaped, covered with long dull white hairs.

E. dyeri is one of the new species recognised by Dr. Marloth but never published by him. In 1927 he examined the specimens collected by Dr. R. A. Dyer (quoted above) and in correspondence proposed the name *E. dyeri*. He also pointed out that MacOwan's specimen No. 1822 from the Boschberg, which had erroneously been quoted under *E. pubescens* (Fl. Cap. VI. 373, 1897), should now be attributed to the new species. Because of Dr. Dyer's long continued interest in the genus it is fitting that the name proposed by Dr. Marloth should be retained.

E. dyeri and *E. pubescens* are primarily distinguished by their inflorescence which in *E. dyeri* is spicate with pedicels less than 1 cm. long whereas in *E. pubescens* Jacq. (Plant. rari. horti Schoenbr. iii. t. 265, 1794) the pedicels are 2·5 cm. long. In *E. lanuginosum* Jacq. (ibid. iii, t. 264) the only other species with cordate hairy leaves, the pedicels are even longer.

In the Kamtra River Valley, where the type was found and which is probably also the locality where Dyer 951 was collected, plants occur at an altitude of about 150 feet on sandy quartzitic soils on banks and under rock ledges on a steep slope of southern aspect. The surrounding vegetation has many elements in common with the Western Cape Province flora, including species of *Passerina, Erica, Restio* and *Cyperus.* It also occurs with similar associates at much higher altitudes, between 2,000 and 3,000 feet, on southern slopes of the Zuurberg range in the Alexandria and Albany districts. Here also the massive tuber close to the surface of the soil and the well-preserved remains of former leaves are characters which make the species easily distinguished at any season of the year.

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